A STUDY OF THE ACADEMIC PREPARATION IN MATHEMATICS OF JUNIOR-HIGH-SCHOOL MATHEMATICS TEACHERS IN KANSAS 1964-1965

by

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INTRODUCTION

There is some debate concerning the preparation and qualifications of junior-high-school teachers. The junior high school has been called a "no-man's land" as far as teacher certification is concerned because few states have established specific requirements for certification to teach in the junior high school.[1] There also appears to be some discussion as to the type of teacher preparation which is best suited to the junior-high-school level. This report examines the preparation in mathematics of junior-high-school mathematics teachers in Kansas in 1964-1965. It may be useful in answering questions concerning the preceding subjects and in comparing the mathematics preparation of junior-and-senior-high-school mathematics teachers.

Statement of the Problem

This study involved the junior-high-school mathematics teachers in Kansas in 1964-1965. The purpose was (1) to determine the average number of college credits in mathematics held by the teachers, (2) to determine the prevalence of master's degree teachers among these teachers, and (3) to

[1] R. E. Pingry, "For a Better Mathematics Program in the Junior High School," *The Mathematics Teacher*, 49:118, February, 1956.

compare the average number of credits in mathematics of the teachers on the basis of degree held, size of school where teacher teaches, and number of classes of junior-high-school mathematics taught by the teacher.

Significance of the Problem

This study is in the area of research on junior high schools. Very little has been done in this area and any research should be of value. The research and results in this report may be used to answer questions concerning teacher certification as well as questions about the type of teachers who are teaching in the junior high school. The report may be valuable in comparing the preparation in mathematics of junior-and-senior-high-school mathematics teachers. It may also be very useful in studies of the preparation of junior-high-school teachers as well as studies of the size and curriculum of the junior high school.

The problem is significant because there appear to be two divergent views as to what the preparation of junior-high-school teachers should be. One view is that there should be a change in the requirements for certification to teach junior high school. R. E. Pingry states that there either should be a separate curriculum and certification requirements for junior-high-school teachers or else there should be a tightening of certification requirements. He feels that there is a tendency for teachers at the junior-high-school level to be placed according to scheduling expediencies rather than according to their background and qualifications.[2]

The other view is represented by Parrish who feels that the teacher who is not a rigorous mathematician and is more interested in his student than in mathematics is often the best mathematics teacher at the junior-high-school level. The teacher who values mathematics intrinsically may be frustrated by his students and neglect those who do not share his interest. The other type of teacher, who teaches mathematics only because he is scheduled to teach it, may understand his students better and, as a result, be a better teacher.[3] The question remains as to what the qualifications of the junior-high-school mathematics teacher should be.

This study determined what the mathematics preparation of the Kansas junior-high-school mathematics teachers actually was in 1964-1965. It is hoped that this report will

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[2] Ibid.

[3] Clyde E. Parrish, "Junior High School Mathematics and the Manpower Shortage," The Mathematics Teacher, 49:613-14, December, 1956.

supplement and add to such studies as that of Burger[4] which determined the academic qualifications of all Kansas high-school mathematics teachers in 1957-1958, as well as any future studies in this area.

Assumptions and Limitations

The information presented in this report is primarily limited to that available from the 1964-1965 Junior-high-school Principal's Organization Reports which were available in the Kansas State Department of Public Instruction in February, 1965. This included both public and non-public junior high schools. In most instances it was assumed that the principals' reports were correct. In a few cases, however, there was some question about the credits earned by the teachers, and it was necessary to consult the college transcripts of the teachers which were also on file in the Kansas State Department of Public Instruction. Even this was not completely accurate due to the fact that teachers are not required to keep their transcripts up-to-date between applications for certificates. In a very few cases, it was

[4] John M. Burger, "Background and Academic Preparation of the Mathematics Teachers in the Public High Schools of Kansas, 1957-1958," The Emporia State Research Studies, 7:57, March, 1959.

necessary to make the best estimate possible with the information available.

The only degrees which were considered in this study were bachelor's and master's degrees. More advanced degrees such as specialist in education were not considered. The research for this study was limited to the 1964-1965 school year.

Definition of Terms

Junior High School. As used in this report, junior high school means any school which satisfies the requirements for junior high schools as listed in the Kansas Secondary School Handbook[5] and for which there were principal's organization reports on file at the Kansas State Department of Public Instruction for 1964-1965.

Junior-High-School Mathematics Teacher. Any teacher who teaches at least one class of mathematics in a junior high school is classified as a junior-high-school mathematics teacher.

Credits. These are the semester hours of college credit in mathematics held by the teacher.

[5] Kansas State Board of Education, Kansas Secondary School Handbook, (Topeka: State Board of Education, 1961), pp. 13-16.

Degree Held. This is the last college degree which was earned by the teacher and generally designated as bachelor's or master's degree.

Classes Taught. The periods per day which the teacher spends teaching junior-high-school mathematics are classified as classes taught.

Size of School. As used in this report, size of school is determined by dividing the total enrollment of the junior high school, as listed in the principal's report, by the number of grade levels taught in the school. This is necessary in order to compare the schools on the same basis since the type of organization ranges from one to four years.

Organization of School. The number of grade levels which are taught in the particular school being discussed determines the organization of the school. Schools varied from consisting of seventh grade only to including grades seven through ten in the same school.

Qualification to Teach. As used in this report, qualification to teach is determined by the requirements as given in the Certificate Handbook of July 1, 1964. It states that a junior-high-school mathematics teacher must possess an elementary or secondary certificate with at least fifteen hours in mathematics.[6]

PROCEDURES USED

As stated previously, the primary source of the information contained in this report was the Junior-high-school Principal's Organization Reports for 1964-1965. The data which were obtained from the reports and recorded about each teacher included the name of the school as well as the name of the teacher, name and number of classes taught, size and type of organization of the school, teacher's number of credits in mathematics, and the last degree earned by the teacher.

From the information recorded, the necessary calculations were made, and the tables and charts which follow were constructed. It appeared that categories based on size of school and number of classes of junior-high-school mathematics taught by the teacher would be most pertinent.

REVIEW OF THE LITERATURE

Literature concerning the academic preparation of junior-high-school mathematics teachers can be divided into

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[6] Kansas State Board of Education, Certificate Handbook, (Topeka: State Board of Education, 1964), p. 56.

two major fields. These include the recommended preparation for teachers and the actual preparation of the teachers.

The exact requirements for junior-high-school mathematics teachers are very vague. As recently as 1955, nine states had not established regulations for formally recognizing junior high schools and three more were only in the process of doing so. At that time only twelve states listed separate criteria and standards for the junior high school. Almost all states permitted holders of secondary certificates to teach grades seven and eight. In approximately thirty-five states both elementary and secondary certificate holders could teach junior high school. The subject-matter requirements for junior-high-school teachers were basically the same as those for secondary teachers. Only nine states issued specific junior-high-school certificates.[7] The requirements for these certificates were generally "completion of a program for the education of junior high school teachers in an approved institution."[8]

A review of the requirements for 1964 indicates that

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[7]Grace S. Wright, State Policies and Regulations Affecting the Junior High School, Office of Education, United States Department of Health, Education and Welfare, Bulletin 12 (Washington: Government Printing Office, 1955), pp. 2-13.

[8]*Ibid.*, p. 29.

there have been few changes since 1955. The states generally require an elementary or secondary certificate with approximately the same subject-matter requirements for junior-high-school teachers as for secondary teachers.[9]

In 1962, Ralph E. Ackerman determined from a survey of 246 colleges and universities preparing teachers that two hundred of them provided some special facility, course or program for junior-high-school teachers. Only thirty-six schools provided a special curriculum for junior-high-school teachers, however. These curricula were generally combinations of the elementary and secondary curricula and required a broad background and more than one teaching field.[10]

Myron F. Rosskopf says that there should definitely be a difference in the preparation of junior-high-school and senior-high-school teachers. This should be primarily in the type of courses taken rather than in the number.[11]

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[9] Elizabeth H. Woellner and M. Aurilla Wood, Requirements for Certification, 29th Edition (Chicago: University of Chicago Press, 1964), pp. 2-128.

[10] Ralph E. Ackerman, "The Preparation of Junior High School Teachers," Journal of Teacher Education, 13:69, March, 1962.

[11] Myron F. Rosskopf, "Professionalized Subject Matter for Junior High School Mathematics Teachers," Mathematics Teacher, 46:541-7, December, 1953.

Other writers such as Lansdowne,[12] Brimm,[13] and Gruhn and Douglas[14] feel that the junior-high-school mathematics teacher should be well-prepared in his field, but he should also have a wide background and varied interests. They feel that the high-school teachers who are more specialized are often not suited for teaching the more general courses at the junior-high-school level.

The lack of specific requirements for junior-high-school teachers has hampered recommendations for the preparation in mathematics of such teachers. There is considerable over-lapping between junior-high-school and senior-high-school teacher requirements. Since very little mathematics is generally required for elementary teachers, this report is primarily concerned with junior-high-school and senior-high-school requirements.

In 1964 the Mathematics Advisory Committee of the

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[12] Brenda Lansdowne, "Creating Mathematicians," Arithmetic Teacher, 8:98-101, March, 1961.

[13] R. P. Brimm, The Junior High School (Washington: The Center for Applied Research in Education, Inc., 1963), pp. 72-73.

[14] William T. Gruhn and Harl R. Douglas, The Modern Junior High School (New York: The Ronald Press Company, 1947), p. 362.

Kansas State Department of Public Instruction recommended that the certification requirements for all secondary mathematics teachers be at least eighteen credits of mathematics at, or beyond, the level of calculus. This is a minimum requirement, and senior-high-school teachers should have considerably more credits than this. These recommendations also included a requirement of at least six credits in mathematics for all elementary teachers.[15]

Recommendations for preparation of mathematics teachers in mathematics have been made by three groups of national importance. In 1940 the National Council of Teachers of Mathematics (N. C. T. M.) recommended thirty-six credits of mathematics for teachers who teach only high-school mathematics and twenty-four credits of mathematics for teachers of mathematics and a second subject.[16]

In 1959 a committee of the American Association for the Advancement of Science (A. A. A. S.) gave recommendations for mathematics teachers on three levels. These levels

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[15] Kansas Association of Teachers of Mathematics, "Recommended Requirements for Teachers," Bulletin of the Kansas Association of Teachers of Mathematics, 39:29-30, April, 1965.

[16] National Council of Teachers of Mathematics, The Place of Mathematics in Secondary Education, Fifteenth Yearbook (New York: Bureau of Publications, Teachers College, Columbia University, 1940), pp. 200-3.

consisted of senior-high-school teachers of mathematics only, junior-high-school teachers of mathematics only, and junior-high-school teachers with a mathematics minor. The recommended numbers of mathematics credits were thirty, twenty-four, and eighteen respectively.[17] The primary difference between the N. C. T. M. and the A. A. A. S. reports was in the type of course work required rather than the amount.

The most recent, and probably most influential, recommendations for preparation of mathematics teachers were given in 1960 by the Committee on the Undergraduate Program in Mathematics (C. U. P. M.) of the Mathematical Association of America. This report classified teachers in four levels. Levels one and four included elementary and college teachers. Level two was teachers of the elements of algebra and geometry (Grades 7-10), and level three was teachers of high school mathematics (Grades 9-12). The approximate minimum numbers of credits in mathematics, at or beyond the level of calculus, were recommended as 21 for level two and 33 for level three. This normally would

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[17] American Association for the Advancement of Science, "Recommendations for the Preparation of High School Teachers of Science and Mathematics," <u>School Science and Mathematics</u>, 59:281-89, April, 1959.

correspond to a minor and a major in mathematics.[18] The C. U. P. M. report also carefully outlined the type of courses that should be taken by the teachers.

James B. Conant agrees with the C. U. P. M. recommendations. He feels, however, that they are minimums, and he recommends at least thirty-nine credits beyond introductory courses in mathematics for all secondary mathematics teachers.[19]

The preceding information still leaves the question as to what is the actual preparation of mathematics teachers in their chosen teaching field. The conclusions of a 1961 survey of mathematics teachers were included in a report by the National Association of State Directors of Teacher Evaluation and Certification and the American Association for the Advancement of Science. It estimated that 23 per cent of the classes in grades nine through twelve were taught by teachers with less than eighteen credits of mathematics. For grades seven and eight, it was estimated that 53 per cent of the classes of mathematics were taught by

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[18]Mathematical Association of America, "Recommendations of the Mathematical Association of America for the Training of Teachers of Mathematics," _The American Mathematical Monthly_, 67:982-88, December, 1960.

[19]James Bryant Conant, _The Education of American Teachers_ (New York: McGraw-Hill Book Company, Inc., 1963), p. 107.

teachers with less than eighteen credits of mathematics and that 34 per cent of the classes were taught by teachers having less than nine credits of mathematics.[20]

A United States Office of Education study examined the mathematics preparation of 799 mathematics teachers in Maryland, New Jersey, and Virginia in 1957-1958. It found that 7 per cent of the teachers had taken no college mathematics courses. The average number of credits in mathematics for all of the teachers was twenty-three.[21]

In a 1957-1958 study, John M. Burger examined the academic preparation of the high-school mathematics teachers in Kansas. He found that 38.7 per cent of all mathematics teachers had sixteen or less credits in mathematics and only 27.5 per cent had more than twenty-eight credits. In comparison, the teachers classed as full-time mathematics teachers had 22.3 per cent with sixteen or less credits in

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[20]National Association of State Directors of Teacher Education and Certification and the American Association for the Advancement of Science for the National Science Foundation, Secondary School Science and Mathematics Teachers: Characteristics and Service Loads (Washington: Government Printing Office, 1961).

[21]Kenneth E. Brown and Ellsworth S. Obourn, Qualifications and Teaching Loads of Mathematics and Science Teachers, United States Department of Health, Education and Welfare, Circular 575 (Washington: Government Printing Office, 1959), p. 5.

mathematics and 41.2 per cent with more than twenty-eight credits. The difference was caused by the lack of preparation of the part-time mathematics teacher.[22]

Burger also found that 32.7 per cent of the bachelor's degrees and 12.5 per cent of the master's degrees held by the mathematics teachers were in mathematics. Of the total teachers 39.5 per cent had received master's degrees.[23]

As evidenced by the review of the literature, information concerning the preparation in mathematics of junior-high-school mathematics teachers is very limited. For this reason the research in this report should be valuable.

It is hoped that the academic qualifications of mathematics teachers will continue to improve by raising the requirements for graduation from college, by National Science Foundation institutes and other in-service training programs, and by self-study programs.[24]

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[22] Burger, _op. cit._, p. 27.

[23] _Ibid._, pp. 23-25.

[24] John J. Kinsella, _Secondary School Mathematics_ (New York: The Center for Applied Research in Education Inc., 1965), pp. 98-100.

ANALYSIS OF RESULTS

As defined in this report, the "size" of a junior high school is the total enrollment of the school divided by the number of grade levels taught in the particular school. For example, the "size" of a junior high school which had a total enrollment of 540 for three grade levels, seventh, eighth, and ninth, would be in the 101-200 students per-grade-level range. If another junior high school is organized with only the seventh and eighth grades and still has a total enrollment of 540, its "size" would be listed in the 201-300 students-per-grade-level range.

Table I gives the distribution of schools and mathematics teachers with respect to the size of school. There were 108 junior high schools and 499 junior-high-school mathematics teachers involved in this study. The largest number of schools was in the 101-200 pupils per-grade-level group with thirty-seven schools or about one-third of the total number of schools. This was almost as many schools as there were in the groups under 101 and over 333, which totalled thirty-eight. The second largest group of schools was in the 201-333 range with thirty-three schools. Only about one-fifth of the schools had less than 100 pupils per grade level.

TABLE I

DISTRIBUTION, ACCORDING TO SIZE OF SCHOOL, OF KANSAS JUNIOR HIGH SCHOOLS AND JUNIOR-HIGH-SCHOOL MATHEMATICS TEACHERS, 1964-1965

Size* of School	Number of Junior High Schools	Number of Mathematics Teachers	Per Cent of Total Mathematics Teachers	Average Number of Mathematics Teachers per School
Under-34	2	2	0.4	1.00
34 - 66	11	16	3.2	1.50
67 - 100	9	23	4.6	2.60
101 - 200	37	137	27.3	3.70
201 - 333	33	196	39.3	5.90
334 and over	16	125	25.2	7.80
All Schools	108	499	100.0	4.60

*Total enrollment divided by number of grade levels.

Although there were fewer schools in the 201-333 range than in the 101-200 range, by far the largest number of mathematics teachers was in schools in the 201-333 range. For schools in the 201-333 range there were 196 mathematics teachers as compared to 137 mathematics teachers in the 101-200 range schools. Although there were only sixteen schools in the 334 and over range, there were 125 mathematics teachers in the schools of this size. Only 41 of the teachers were in schools from 0 to 100 pupils per grade level.

The preceding information can be related to the average number of mathematics teacher per school which increased almost in direct proportion to the increase in the size of school. It ranged from one mathematics teacher per school for the under-34 range to almost eight mathematics teachers per school for schools in the 334-and-over range. The average number of mathematics teachers for all schools was four and six-tenths.

The number of junior-high-school mathematics teachers and the average credits earned by them are divided according to the number of mathematics classes taught in Table II. The number of mathematics classes taught by the teachers ranged from one to six. The largest group of teachers was the 293 teachers who taught five classes of mathematics.

TABLE II

DISTRIBUTION, ACCORDING TO NUMBER OF MATHEMATICS CLASSES TAUGHT, OF KANSAS JUNIOR-HIGH-SCHOOL MATHEMATICS TEACHERS AND OF THE AVERAGE NUMBER OF MATHEMATICS CREDITS HELD BY THE TEACHERS, 1964-1965

Number of Mathematics Classes Taught	Number of Mathematics Teachers	Per Cent of Total Mathematics Teachers	Average Number of Mathematics Credits Per Teacher
1	18	3.8	20.0
2	35	6.9	25.8
3	28	5.8	24.8
4	43	8.4	32.3
5	293	58.5	35.6
6	82	16.6	32.1
All Teachers	499	100.0	32.9

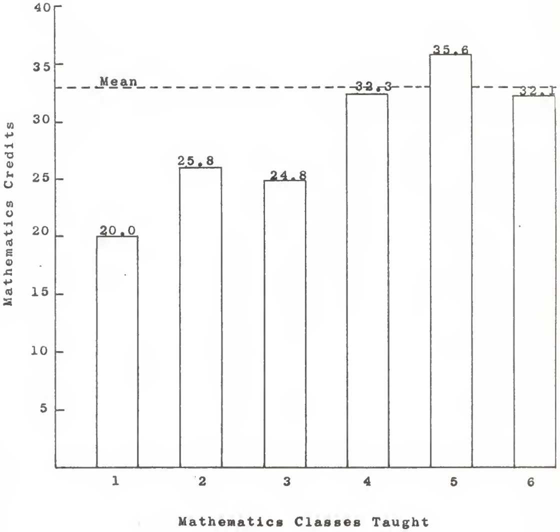

FIGURE I

AVERAGE MATHEMATICS CREDITS FOR KANSAS JUNIOR-HIGH-SCHOOL MATHEMATICS TEACHERS IN RELATION TO NUMBER OF JUNIOR-HIGH-SCHOOL MATHEMATICS CLASSES TAUGHT 1964-1965

The next largest group was the 82 teachers who taught six classes of mathematics. About one-fourth of the teachers taught less than five classes of mathematics.

The average credits earned by the teachers in mathematics generally increased with the number of classes taught. This would be expected since those teachers who were teaching less than five classes of mathematics were probably teaching other subjects and would have teaching fields other than mathematics. Consequently, their training might not be concentrated as heavily in mathematics.

The average number of credits in mathematics of all junior-high-school mathematics teachers was 32.9. Those teachers who were teaching only one class of mathematics averaged only 20 credits in mathematics. This average gradually increased with the number of classes of mathematics taught until the group teaching five classes was reached. This group had the highest average number of credits in mathematics with 35.6 credits. Teachers teaching six classes of mathematics averaged only 32.1 credits which was even slightly less than for teachers teaching four classes. A possible explanation for this might be that the better-prepared teachers tend to go to the school systems where they are not required to teach more than five classes.

Table III gives the distribution of credits earned and classes taught by the teachers with respect to the size of the school. The average number of credits in mathematics generally increased with an increase in the size of the school. The least average credits was nineteen for the under-34 pupils per-grade-level group and the greatest average credits was almost thirty-five for the 334-and-over group. The average number of credits in mathematics was considerably higher for teachers in schools greater than 100 pupils per grade level.

It should be noted that the average number of classes of mathematics taught by the teachers increased with the size of the school from 2.5 classes for the smallest schools to 4.8 classes for the largest schools. Just as the teachers in schools of greater than 100 pupils per grade level had considerably more credits in mathematics, they also taught considerably more classes of mathematics than the other teachers.

An aspect of the academic qualifications of teachers other than credits in mathematics is the last degree earned by the teacher. This gives some measure of the teacher's background and training. By examining Table IV, the distribution of bachelor's and master's degree teachers with

TABLE III

DISTRIBUTION, ACCORDING TO SIZE OF SCHOOL, OF CREDITS IN MATHEMATICS HELD AND CLASSES OF MATHEMATICS TAUGHT BY KANSAS JUNIOR-HIGH-SCHOOL MATHEMATICS TEACHERS
1964-1965

Size* of School	Number of Mathematics Teachers	Average Number of Mathematics Credits Per Teacher	Average Number of Mathematics Classes Taught by Teachers
Under-34	2	19.0	2.5
34-66	16	25.0	3.9
67-100	23	24.8	2.9
101-200	137	34.2	4.6
201-333	146	32.4	4.7
334 and over	125	34.8	4.8
All Mathematics Teachers	499	32.9	4.6

*Total enrollment divided by number of grade levels.

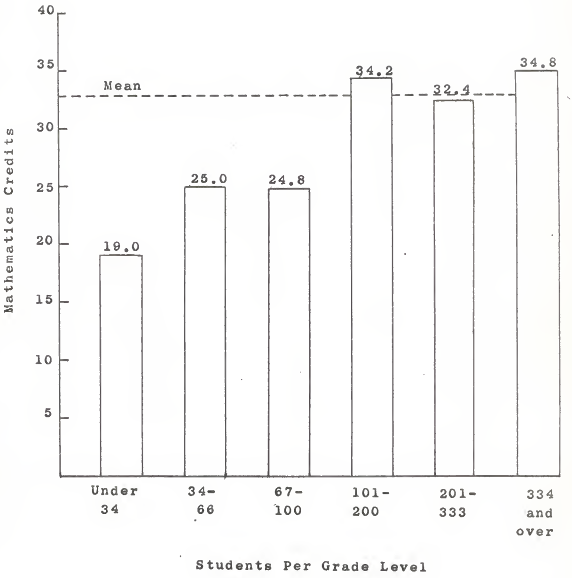

FIGURE II

AVERAGE MATHEMATICS CREDITS FOR KANSAS JUNIOR-HIGH-SCHOOL MATHEMATICS TEACHERS IN RELATION TO SIZE OF SCHOOL, 1964-1965

TABLE IV

DISTRIBUTION, ACCORDING TO SIZE OF SCHOOL, OF BACHELOR'S AND MASTER'S DEGREE JUNIOR-HIGH-SCHOOL MATHEMATICS TEACHERS IN KANSAS, 1964-1965

Size* of School	Number of Mathematics Teachers	Mathematics Teachers with Bachelor's Degree		Mathematics Teachers with Master's Degree	
		Number	Per Cent	Number	Per Cent
Under-34	2	0	0.0	2	100.0
34-66	16	12	75.0	4	25.0
67-100	23	15	69.6	7	30.4
101-200	137	90	65.0	48	35.0
201-333	196	130	66.3	66	33.7
334 and over	125	96	76.8	29	23.2
All Teachers	499	343	68.7	156	31.2

*Total enrollment divided by number of grade levels.

regard to the size of the school can be determined.

Of all the junior-high-school mathematics teachers, 31.3 per cent had master's degrees. With the exception of the under-34 pupils per-grade-level group in which both teachers had master's degrees, the highest percentage of mathematics teachers with master's degrees was in the 101-200 pupils per-grade-level schools with 35 per cent. The percentage of teachers with master's degrees decreased as schools became both smaller and larger than the 101-200 group. It is interesting to note that the smallest percentage of teachers with master's degrees was in the 334-and-over group who had only 23.2 per cent.

One possible reason for the low percentage of teachers with master's degrees in the 334-and-over group might be that most of these schools are in rapidly growing urban areas where it is necessary to hire many new teachers. It is possible that many of these teachers have not had time to complete a master's degree.

Presented in Table V is the number of master's degree and bachelor's degree teachers with respect to the number of classes of mathematics taught. One of the most noticeable facts about the table is the large per cent (38.9 per cent) of the teachers teaching one class of mathematics who had

TABLE V

DISTRIBUTION, ACCORDING TO NUMBER OF MATHEMATICS CLASSES TAUGHT OF BACHELOR'S AND MASTER'S DEGREE JUNIOR-HIGH-SCHOOL MATHEMATICS TEACHERS IN KANSAS, 1964-1965

Number of Mathematics Classes Taught	Number of Mathematics Teachers	Mathematics Teachers with Bachelor's Degree		Mathematics Teachers with Master's Degree	
		Number	Per Cent	Number	Per Cent
1	18	11	61.1	7	38.9
2	35	27	77.1	8	22.9
3	28	19	67.9	9	32.1
4	43	29	67.4	14	32.6
5	293	194	66.2	99	33.8
6	82	63	76.8	19	23.2

master's degrees. Also noticeable was the small per cent (23.2 per cent) of the teachers teaching six classes of mathematics who held master's degrees. Other than the one-class group, the highest per cent (33.8 per cent) of teachers with a master's degree was in the five-class group with the per cent decreasing as the number of mathematics classes taught decreased.

Table VI divides the junior-high-school mathematics teachers and their average number of credits in mathematics according to the last degree earned. As stated before, about one-third of the junior-high-school mathematics teachers hold master's degrees. The important fact to be noted from this table is the small difference of only two and one-tenth credits in the average number of credits in mathematics for teachers with bachelor's and master's degrees. This would definitely seem to indicate that many teachers have received their advanced degrees in fields other than mathematics.

Tables VII and VIII are presented primarily to emphasize the wide range of the number of credits in mathematics which have been earned by junior-high-school mathematics teachers. Table VII gives the divisions with respect to size of school and Table VIII gives the divisions with

TABLE VI

DISTRIBUTION, ACCORDING TO LAST DEGREE EARNED, OF JUNIOR-HIGH-SCHOOL MATHEMATICS TEACHERS AND OF MATHEMATICS CREDITS HELD BY THESE TEACHERS IN KANSAS, 1964-1965

Type of Degree	Number of Mathematics Teachers	Per Cent of Total Mathematics Teachers	Average Number of Mathematics Credits
Bachelor's	343	68.7	32.0
Master's	156	31.3	34.9
All Teachers	499	100.0	32.9

TABLE VII

RANGE, ACCORDING TO SIZE OF SCHOOL, OF CREDITS IN MATHEMATICS FOR KANSAS JUNIOR-HIGH-SCHOOL MATHEMATICS TEACHERS, 1964-1965

Size* of School	Number of Mathematics Credits Held by a Teacher in the Group		Range of Credits in Group
	Minimum	Maximum	
Under-34	15	23	8
34-66	9	51	42
67-100	9	38	29
101-200	8	69	61
201-333	4	74	70
334 and over	2	93	91

*Total enrollment divided by number of grade levels.

TABLE VIII

RANGE, ACCORDING TO NUMBER OF MATHEMATICS CLASSES TAUGHT, OF CREDITS IN MATHEMATICS OF KANSAS JUNIOR-HIGH-SCHOOL MATHEMATICS TEACHERS, 1964-1965

Number of Mathematics Classes Taught	Number of Mathematics Credits Held by a Teacher in the Group		Range of Credits in Group
	Minimum	Maximum	
1	2	49	47
2	4	59	55
3	6	71	65
4	9	66	57
5	9	93	84
6	6	68	62

respect to the number of mathematics classes taught. Since the mean numbers of credits have been presented as averages in other tables, this section emphasized only the range of credits. The greatest number of credits in mathematics earned by a teacher was ninety-three and the least number was two credits. It was interesting to note that both of them were in the 334-and-over pupils per-grade-level group. The range generally decreased with a decrease in the size of the school until the under-34 group had a range of only eight credits.

The number of classes of mathematics taught did not appear to affect the range of credits in mathematics. The maximum range was for the five-class group and the minimum range was for the one-class group.

One very important aspect of the study of academic preparation of junior-high-school mathematics teachers was the number of teachers who failed to have sufficient credits in mathematics to meet the minimum certification requirements as established by the Kansas State Department of Public Instruction. These requirements demand at least fifteen credits of mathematics for certification. There were eighteen or 3.6 per cent of the total teachers who failed to have this many credits.

In Table IX the number and per cent of teachers in each size of school who failed to have at least fifteen credits of mathematics are listed. The highest per cent of such teachers was in the 34-66 pupils per-grade-level group and, with the exception of the under-34 group where both teachers had at least fifteen credits, the lowest per cent of teachers with insufficient credit was 2.4 per cent of the 334-and-over group. The number of teachers with less than fifteen credits generally decreased with an increase in the size of the school.

Table X lists the number and per cent of teachers with insufficient credits for certification who are teaching a particular number of classes of junior-high-school mathematics. Teachers who are teaching only one class of mathematics have the highest per cent (33.3 per cent) of teachers with insufficient credit. The per cent generally decreases as the number of classes of mathematics taught increases. As a result, the lowest per cent of teachers with less than fifteen credits of mathematics is 1.4 per cent for the group of teachers who taught five classes of mathematics. It is interesting to note that the teachers teaching four, five, and six classes of mathematics were considerably above average in meeting the state certification requirements.

TABLE IX

NUMBER AND PER CENT OF KANSAS JUNIOR-HIGH-SCHOOL MATHEMATICS TEACHERS FAILING TO MEET MINIMUM CERTIFICATION REQUIREMENTS IN MATHEMATICS, ACCORDING TO SIZE OF SCHOOL, 1964-1965

Size* of School	Number of Mathematics Teachers	Mathematics Teachers with Insufficient Credit in Mathematics for Certification	
		Number	Per Cent
Under-34	2	0	0.0
34-66	16	2	12.5
67-100	23	1	4.3
101-200	137	6	4.4
201-333	196	6	3.1
334 and over	125	3	2.4
All Teachers	499	18	3.6

*Total enrollment divided by number of grade levels.

TABLE X

NUMBER AND PER CENT OF KANSAS JUNIOR-HIGH-SCHOOL MATHEMATICS TEACHERS FAILING TO MEET MINIMUM CERTIFICATION REQUIREMENTS IN MATHEMATICS ACCORDING TO NUMBER OF CLASSES OF MATHEMATICS TAUGHT, 1964-1965

Number of Mathematics Classes Taught	Number of Mathematics Teachers	Mathematics Teachers with Insufficient Credits in Mathematics for Certification	
		Number	Per Cent
1	18	6	33.3
2	35	2	5.7
3	28	3	10.7
4	43	1	2.1
5	293	4	1.4
6	82	2	2.4

Tables IX and X agree with the findings in other tables which show that, in general, as the size of the school and the number of classes of mathematics taught increases, the preparation in mathematics of the teachers improves. This was true in almost all results of measures of the preparation of junior-high-school mathematics teachers.

Although the number of credits in mathematics held by the teachers generally increased as the size of school and number of classes taught increased, there was a fairly low correlation between them. The correlation coefficient for size of school and number of credits in mathematics was .14. For the number of classes taught and the number of credits in mathematics, the coefficient was .24.

SUMMARY AND CONCLUSIONS

The purpose of this report was to study the academic qualifications in mathematics of the junior-high-school mathematics teachers in Kansas in 1964-1965. The data used was obtained from the files of the Kansas State Department of Public Instruction. The two measurements of the qualifications which were used were the number of credits in mathematics and the last degree earned by the teacher. These measurements were then analyzed with respect to size of school and number of classes of mathematics taught by the teachers. To have a uniform comparison between schools, the "size" of a school was determined by dividing the total enrollment by the number of grade levels taught.

Of a total of 499 teachers, only 8.2 per cent were in schools which were under 100 pupils per-grade-level in size. For these groups it is important to note that the sample size was small and this reduced the significance. This was also true for the groups who taught three or less classes.

Although the largest number of schools was in the 101-200 size group, the most teachers were in the 201-333 size group. This was due to the fact that there were four less schools but more than two more teachers per school in the 201-333 group. There were only sixteen schools in the 334-and-over group but they had 25.2 per cent of the total teachers.

By far the largest per cent (58.5 per cent) of the mathematics teachers taught five classes of mathematics. The per cent of teachers in the other groups tended to become smaller as the number of classes taught became smaller. The five-class group also had the highest average credits in mathematics, with the four and six-class groups slightly less. The credits for the other groups tended to decrease as the number of classes of mathematics taught decreased.

Generally, the average number of mathematics credits held by the teachers as well as the average number of classes of mathematics taught increased as the size of the school increased. The average number of credits held by the teachers ranged from nineteen for the under-34 size group to thirty-four and eight-tenths credits for the 334-and-over group. Similarly, the average number of classes taught ranged from 2.5 to 4.8 classes.

In a manner similar to the average credits, the percentage of mathematics teachers with a master's degree tended to increase as the size of school and the number of classes of mathematics taught increased. The notable exceptions in both cases were in the first and last groups of teachers where the under-34 size group and the one-class group each had an unusually large percentage of master's degrees while the percentage of master's degrees in the 334-and-over group and the six-class group was unusually low.

One of the most interesting results of this study was the small difference in the average mathematics credits earned by bachelor's and master's degree teachers. The teachers with master's degrees averaged only two and one-tenth more credits than the teachers with bachelor's degrees. This would definitely seem to indicate that many junior-high-school mathematics teachers are getting advanced degrees in a field other than mathematics and are taking few if any graduate mathematics courses.

The range of credits in mathematics is of interest primarily because it shows both the largest and the smallest number of mathematics credits earned by teachers in each group. The credits ranged from two to ninety-three or a total range of ninety-one credits. The average number of credits in mathematics for all teachers was thirty-two and nine-tenths.

In agreement with the findings for average credits and the number of master's degrees, the percentage of teachers who failed to have the fifteen or more credits in mathematics necessary for certification generally decreased with an increase in the size of school and in the number of classes of mathematics taught.

The major conclusions that can be drawn from this report are that the academic preparation in mathematics of the junior-high-school mathematics teachers in Kansas are generally better as the size of the school increases. The best prepared teachers are in schools of the 101-200 size group and teach five classes of mathematics.

The findings compare very well with Burger's findings for high-school mathematics teachers in 1957-1958. Considering the emphasis which has been placed on improving the preparation of mathematics teachers since his study was conducted, it would appear that the average preparation in mathematics of junior-high-school mathematics teachers compares very favorably with the preparation of high-school mathematics teachers.

Since the exact courses which were taken by the mathematics teachers were not determined, it is difficult to compare the conclusions of this report with the recommendations of the C. U. P. M. report. It is not known how many of the courses in mathematics were below the level of calculus and would not satisfy the C. U. P. M. requirements.

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A STUDY OF THE ACADEMIC PREPARATION IN MATHEMATICS OF JUNIOR-HIGH-SCHOOL MATHEMATICS TEACHERS IN KANSAS 1964-1965

by

Kenneth Ted Metcalf

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AN ABSTRACT OF A MASTER'S REPORT

submitted in partial fulfillment of the

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MASTER OF SCIENCE

School of Education

KANSAS STATE UNIVERSITY
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Approved by:

Major Professor

This report concerned the academic preparation in mathematics of junior-high-school mathematics teachers in Kansas in 1964-1965. It compared the number of credits in mathematics held by the teachers with respect to size of school, number of classes of mathematics taught, and last degree earned.

The data presented in the report was taken from the 1964-1965 Junior High School Principal's Organization Reports on file at the Kansas State Department of Public Instruction. All schools for which the junior high school reports were on file were included. The "size" of a junior high school was determined by dividing the total enrollment by the number of grade levels taught. The last degree earned was designated as either the bachelor's or master's.

There were 108 junior high schools and 499 junior-high-school mathematics teachers studied in this report.

Only 8.2 per cent of these teachers were in schools with less than 100 pupils per grade level. The largest group of teachers taught in schools with 201-333 pupils per grade level although there were more schools in the 101-200 pupils per-grade-level group.

The largest per cent (58.5 per cent) of the mathematics teachers taught five classes of mathematics with the per cent of teachers in the other groups becoming smaller as the number of classes taught became smaller. The group of teachers teaching five classes of mathematics also had the highest average number of credits in mathematics with thirty-five and six-tenths credits. From this group the average mathematics credits decreased as the number of classes of mathematics taught decreased.

In general, the average number of mathematics credits for the teachers increased as the size of the school increased. They ranged from nineteen credits for the under-34 pupils per-grade-level group to thirty-four and eight-tenths credits for the 334-and-over groups.

Of all the teachers in the study, 31.3 per cent had master's degrees. With the exception of the under-34 group, teachers with the highest per cent of master's degrees were those teaching five classes of mathematics and those in schools with 101-200 pupils per grade level. It was interesting to note that the size group with the lowest per cent of master's degrees was the 334-and-over group of mathematics teachers. The teachers with master's degrees averaged only two and one-tenth more credits in mathematics than those with bachelor's degrees. This would seem to indicate that many of the teachers are taking advanced degrees in fields other than mathematics and are taking few if any graduate mathematics courses.

The number of mathematics credits earned by individual teachers ranged from two to ninety-three. For all the teachers, the average number of credits in mathematics was thirty-two and nine-tenths.

The number of teachers who failed to have the fifteen credits in mathematics for certification to teach generally decreased as the size of the school and the number of classes of mathematics taught increased. It ranged from 33.3 per cent of the teachers teaching one class of mathematics to 1.4 per cent of the teachers teaching five classes of mathematics.

Generally, the teachers teaching five classes of mathematics and those teaching in schools with 101-200 pupils per grade level were the best prepared in mathematics.