

COMPARATIVE RANKINGS OF NORMAL SCHOOL GRADUATES  
AND FULL COURSE UNIVERSITY STUDENTS  
IN THE SCHOOL OF EDUCATION

by

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Introduction

There has been much difference of opinion as to which group of students ranks higher in university scholarship---those who enter the School of Education as normal school graduates or those who spend full four years on the college course in Missouri University before graduation from the School of Education. Even when it is assumed that normal school graduates rank higher, the causes for such higher ranking are variously stated. It is argued that normal school graduates are older and more mature and hence have the advantage over regular graduates; that normal school graduates take a greater percent of Education courses in which higher grades are usually given than in academic courses; that normal school graduates take mostly Under Class work; that normal school graduates have had much more teaching experience and should therefore be expected to rank higher in Education courses. It is the purpose of this study to bring together facts and draw conclusions touching the above claims. With this purpose in view the general problems listed under section A, below, have been set for solution.

## A.--- General Problems

- (1) -- To compare the junior and senior abilities of those graduates of the School of Education who entered Missouri University as normal school graduates with the junior and senior abilities of those graduates who took the full four year college course in Missouri University previous to graduation.
- (2) -- To see the general correlation between scholarship in Education courses and non-Education courses.
- (3) -- To find the percent of Education courses and non-Education courses, respectively, taken by each group of graduates.
- (4) -- To find the percent of Extension, Graduate, Upper Class and Under Class courses, respectively, taken by each group, in Education courses, in non-Education courses, and in Education and non-Education courses combined.
- (5) -- To see, in a general way, the correlation between scholarship and age at the time of graduation.
- (6) -- To see, in a general way, the correlation between scholarship and amount of teaching experience at the time of graduation.

### B.--- Scope of the Study

The data for this study were gathered from the junior and senior records of the graduates of the school of Education of Missouri University for the years 1915 and 1916. The disposition made of all the records for the 272 graduates for the two years (including summer graduates) is shown under section D ,below. Only the records of those entering Missouri University directly from high schools and those entering as normal school graduates were used for this study. As indicated in section D ,below, other data were taken but not used in this study.

### C.--- Directions, Decisions, Methods, etc.

In taking the data from the Registrar's records the following rules were observed:

Approximately 132 hours were considered as graduating a student, though students granted the B.S. degree in the School of Education were counted as graduates whether they had 132 hours or less. Some graduates of 1915-16 finished under the 120 hour requirement. In cases where there was as much as 8 hours beyond 132 hours this excess was considered graduate work and no record of it was taken.

A year's work was defined as the work constituting any one of the following combinations:

- (a) Two semesters.
- (b) One semester and two summer sessions.
- (c) Four summer sessions.
- (d) Any other combination which will total the

the equivalent of two semesters, when a summer session is counted equivalent to a half semester.

When necessary, in order to get the above combination, the work of a semester was divided into halves by taking half of the normal hours in each course carried during the semester. No effort was made to divide the work beyond the point of half semesters. For instance, in cases where Extension work had been taken approximately 8 hours was considered equivalent to a half semester and was inserted in the part of the record that date indicated, but where less than 5 hours of Extension work had been taken during the year these hours were merely added to the year's work. Where 5 or more hours of Extension work had been taken they were counted as a half semester of work.

The year of work leading up to graduation, as above defined, was counted as the senior work, and the year of work just preceding the senior work was counted as the junior work. The semesters, summer sessions and Extension work making up each year were indicated opposite the appropriate year on the blank used in gathering the data.

After the work to be included in each year had been determined and noted on the blank the courses of the junior and senior years were listed as follows:

- (I)- Education courses, listed as
  - (a) Extension courses.
  - (b) Graduate courses.
  - (c) Upper Class courses.

(d) Under Class courses.

(2)- Non-Education courses, listed as

(a) Extension courses.

(b) Graduate courses.

(c) Upper Class courses.

(d) Under Class courses.

Each of the above lists was further divided into the number of hours work in which E, S, M, I and F, respectively, were made. See tables I, 2, 3 and 4.

Education courses consist of those listed as (A) Education, as on pages 247 to 252 of the catalog for 1916-1917. The courses listed as (B) Technical Courses, as on pages 252 to 262 of the catalog for 1916-1917, were counted as non-Education courses. All general Psychology courses and the course in Introduction to Religious Education (Bible College) were counted as Education courses. All other university and Bible College courses were counted as non-Education courses.

The catalog classification (for the year in which work was taken) of Graduate, Upper Class and Under Class courses was followed. All work done by correspondence or extension was listed as Extension work, except that Graduate work taken by correspondence was listed as Graduate only. Grades given as "Passed" were assigned the value "M". This occurs only in Physical Training and in a very few Graduate courses.

#### D.--- Disposition Made of Graduates' Records

The following lists show the disposition made of the 272 graduates for the two years:

- (1) The complete junior and senior records of 126 graduates were used in this study.
- (2) The senior records, only, of 32 normal school graduates were used.
- (3) No part of the records of 114 graduates was used.

Only the senior records were used for those normal school graduates who had done less than two years of work in Missouri University before attaining 132 hours of credit.

The 114 graduates whose records were not used are composed of the following:

- (a) 6 presented mixed records composed of part high school and part normal school work done before entrance to this University.
- (b) 19 complicated their records by attending other kinds of schools after graduation from high school or normal school, or after entering Missouri University.
- (c) 62 entered from other kinds of schools.
- (d) 16 made other college degrees before the B.S. in Education.
- (e) 6 spent less than one year here before attaining graduation, due to the option of three summer sessions in residence in lieu of the year in residence.

- (f) I student took the "Honors Courses" and while thereby assumed to be <sup>an</sup> excellent student obtained only grades of "Passed", as provided by the system.
- (g) 3 records were missing from the Registrar's files and could not be located at the time this material was being collected.
- (h) I student had attained 132 hours credit in 1914.

For the 1915 graduates 64 complete junior and senior records were gathered and 10 other records for the senior year, only, but only 49 complete records and 7 senior records were for students entering directly from high schools or normal schools. So only 56 of these records were used in the study made.

From the 1916 graduates' records only 77 complete junior and senior records and 25 additional senior records were used in this study. This number represents the graduates who had entered the University as graduates of either normal schools or high schools. Records of students other than those fitting the above requirements for this study were not taken for the year 1916. So the 102 records listed here represent all the data taken for the 1916 graduates.

The study of the records of the 32 normal school graduates who had spent less than two years in the University was added to give a more representative study of the senior work of normal school graduates. Hence, the study of the senior work is based on 58 records for the normal school

graduates while the study of the junior work is based on only 26 records. On this account we would expect the study of the senior year to be more significant. It is also more significant in that the age and experience data were taken as nearly as possible for the date of graduation. The study of the regular graduates is based on the complete junior and senior records of 100 students. Regular graduates are those who did a full four year college course in Missouri University. Normal school graduates are those who graduated from normal schools before entering the University.

#### E.--- Figuring Percents and Weighting

Two kinds of percents are shown in the tables. The one kind shows the percent of all work (year or two years) represented in each kind of work, the other shows the percent of total hours (within each kind of work or for all kinds of work combined) represented by each grade (E, S, M, I and F). Weighting was done on the basis of this last named kind of percents. In finding percents each case was figured to the nearest two decimal places, the nearest estimated whole integer being used in hundredths place. Two different systems of weights were used:

(a) All the results were weighted, in each case, by multiplying the percent of E's by 1.30, the percent of S's by 1.15, the percent of M's by 1.00, the percent of I's by 0.85, and the percent of F's by 0.00. It will be noted that these are the weights used by Missouri University in estimat-

ing the amount of credit allowed for work done in that university. The resulting figures show the percentage of normal credit attained in the work so weighted and were used as a basis for comparing the standing of the two groups of graduates. Other comparisons were made by noting the percent of work in which E,S,M,I and F grades, respectively, were made by each group in each kind of work.

(b) As a check on the above system of weights some of the results (tables 6 and 9) were weighted in each case by multiplying the percent of E's by 4, the percent of S's by 3, the percent of M's by 2, the percent of I's by 1, and the percent of F's by 0. It will be noted that this system of weights is based on the ranks of the grades received. For instance, F, the lowest in rank, is given the weight 0; I, the next higher in rank, is given the weight 1; M, the next higher, is given the weight 2; etc. The figures resulting from such weighting approximate the average rank of scholarship in the work so weighted. In tables 6 and 9 it will be noted that in every case this system of weights gave the same relative rank as did the Missouri system when used as indicated above. On this account it seemed useless to use both systems of weights throughout the study, so in the rest of the study only the Missouri University system of weights was used in weighting results.

#### F.--- Tabulations, Results and Conclusions

Tables 1, 2, 3 and 4 furnish the basic data for answering each of the above listed problems. These four

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tables are arranged on exactly the same plan and are read in the same way. Thus, the first horizontal column of table I reads: Student No. I, of the normal school graduates, in his senior Education courses carried no Extension work; made M grades in 2 hours of Graduate work; made M grades in 14½ hours of Upper Class work; and carried no Under Class work. In his senior non-Education courses he carried no Extension work; carried no Graduate work; made M grades in 3 hours of Upper Class work; and made M grades in 11 hours of Under Class work. The arrays in the other horizontal columns are similarly read. The totals in the last three horizontal columns of table I read: All normal school graduates in their senior Education courses made M grades in a total of 6 hours or 100 percent of their Extension work, giving a weighted result of 100.00 for Extension courses; made E grades in 6 hours or 22.22 percent of Graduate courses, S grades in 3 hours or 11.11 percent of Graduate courses, M grades in 18 hours or 66.64 percent of Graduate courses; giving a weighted result of 108.30 for their Graduate work; etc. The three horizontal columns at the ends of tables 2, 3 and 4 are similarly read. Students are numbered in each group according to age at the time of graduation.

Problem (I), the relative rankings of the two groups of graduates, is answered directly from tables 5 and 6.

Table 5 brings together in one table the totals from tables 1, 2, 3 and 4 and reads in the same way as those tables, except that the first horizontal column (red) in each

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Folded page: See supplemental file Table 6 for unfolded version.

case represents work of regular graduates and the second (blue) that of normal school graduates. At the bottom of the table is shown the differences between weighted results for the two groups of graduates in the work of the two years combined and the percent of the total two years work represented by such differences in weighted results for each kind of work. Table 6 lists the totals by grades, giving the hours and the percent of all work (regardless of kind) represented by each grade. The first horizontal (red) column in each case represents work of regular graduates and the second (blue) that of normal school graduates. The first horizontal column reads: In the senior year regular graduates made E grades in 154 hours work, S grades in 855½ hours work, M grades in 1781½ hours work, I grades in 249½ hours work, and F grades in 9 hours work, representing 5.05, 28.08, 58.40, 8.18, and 0.29 percent, respectively, of their total senior work, and giving weighted results of 104.21 when weighted by Missouri weights and 2.29 when weighted by 4,3,2,1 and 0. Other columns are similarly read.

From tables 5 and 6 the following differences between the weighted results in each kind of work is shown together with the percent of the total work represented by such differences [The percent of each kind of work is taken from table 8. Section (e) in each case estimates differences in weighted results from table 7] :

I.-- Senior year.

(I) Education courses.

(a) In extension work normal school gradu-

ates in 0.33% of the year's work rank 1.67 below regular graduates in 0.98% of their year's work.

(b) In Graduate work normal graduates in 1.44% of their year's work rank 3.91 above regular graduates in 1.32% of their year's work.

(c) In Upper Class work normal school graduates in 16.20% of their year's work rank 1.94 above regular graduates in 31.80% of their year's work.

(d) In Under Class courses normal school graduates in 3.42% of their year's work rank 1.94 below regular graduates in 1.32% of their year's work.

(e) In all senior Education courses normal school graduates in 21.39% of their year's work rank 2.88 above regular graduates in 35.32% of their year's work.

(2) Non-Education courses.

(a) In Extension work normal school graduates in 0.49% of their year's work rank 2.28 above regular graduates in 0.26% of their year's work.

(b) In Graduate work normal school graduates in 2.16% of their year's work rank 9.61 above regular graduates in 1.36%

of their work.

- (c) In Upper Class work normal school graduates in 27.63% of their year's work rank 4.11 above regular graduates in 34.86% of their year's work.
- (d) In Under Class work normal school graduates in 48.33% of their year's work rank 1.38 above regular graduates in 28.20% of their year's work.
- (e) In all senior non-Education work normal school graduates in 78.61% of their year's work rank 3.05 above regular graduates in 64.68% of their year's work.
- (f) In all senior work normal school graduates in 1810½ hours work rank 3.29 above regular graduates in 3049½ hours work.

## II.-- Junior year.

### (I) Education courses.

- (a) Regular graduates took no Extension work in this year, so there is no basis for comparison.
- (b) In Graduate courses normal school graduates in 0.24% of their year's work rank the same as regular graduates in 0.20% of their year's work.
- (c) In Upper Class work normal school graduates in 5.74% of their year's work rank 9.85 above regular graduates in 18.20%

of their year's work.

(d) In Under Class work normal school graduates in 2.56% of their year's work rank 2.56 below regular graduates in 3.72% of their year's work.

(e) In all junior Education work normal graduates in 8.78% of their year's work rank 6.40 above regular graduates in 22.12% of their year's work.

(2) Non-Education courses.

(a) In Extension work normal school graduates in 0.97% of their year's work rank 5.74 above regular graduates in 0.10% of their year's work.

(b) In Graduate courses normal school graduates in 1.58% of their year's work rank 1.06 above regular graduates in 0.03% of their year's work.

(c) In Upper Class work normal school graduates in 21.25% of their year's work rank 3.17 above regular graduates in 28.45% of their year's work.

(d) In Under Class work normal school graduates in 67.60% of their year's work rank 0.73 below regular graduates in 49.30% of their year's work.

(e) In all junior non-Education work normal school graduates in 91.40% of their

year's work rank 0.69 above regular graduates in 77.88% of their year's work.

- (f) In all junior work normal school graduates in 818½ hours work rank 1.82 above regular graduates in 3044 hours work.

III.-- Junior and senior years combined.

(I) Education courses.

- (a) In Extension work normal school graduates in 0.30% of their two years' work rank 2.08 above regular graduates in 0.44% of their two years' work.
- (b) In Graduate courses normal school graduates in 1.10% of their two years' work rank 4.86 above regular graduates in 0.74% of their two years' work.
- (c) In Upper Class work normal school graduates in 12.94% of their two years' work rank 3.86 above regular graduates in 25% of their two years' work.
- (d) In Under Class work normal school graduates in 3.15% of their two years' work rank 2.72 above regular graduates in 2.55% of their two years' work.
- (e) In all Education work normal school graduates in 17.49% of their two years' work rank 4.07 above regular graduates in 28.73% of their two years' work.

(2) Non-Education courses.

- (a) In Extension work normal school graduates in 0.64% of their two years' work rank 2.00 above regular graduates in 0.18% of their two years' work.
- (b) In Graduate courses normal school graduates in 1.98% of their two years' work rank 10.81 above regular graduates in 0.69% of their two years' work.
- (c) In Upper Class work normal school graduates in 25.65% of their two years' work rank 3.92 above regular graduates in 31.65% of their two years' work.
- (d) In Under Class work normal school graduates in 54.24% of their two years' work rank 0.68 above regular graduates in 38.75% of their two years' work.
- (e) In all non-Education work normal school graduates in 82.51% of their two years' work rank 2.15 above regular graduates in 71.27% of their two years' work.
- (f) In all work for the two years combined normal school graduates in 2629 hours of work rank 2.76 above regular graduates in 6093½ hours of work.

From a study of the above results the following conclusions may be drawn:

- (a) In Extension work normal school graduates rank

higher than regular graduates, except in the senior Education work where only a fraction of one percent of the year's work is represented for each group of graduates.

- (b) In Graduate courses normal graduates rank much higher in every case, except in the junior year where the difference is small but represents only 0.03% of the junior work of regular graduates.
- (c) In Upper Class work normal school graduates rank considerably higher in some cases and some higher in every case than regular graduates.
- (d) In Under Class courses normal school graduates rank slightly higher in the senior work and in the two years' work combined, but slightly lower in the junior work than regular graduates. The instances need to be stated in detail: In the Under Class Education work of the senior year normal school graduates rank 1.94 below the regular graduates, but the small percent of the year's work represented makes this a poor basis for comparison. In the Under Class non-Education work of the senior year normal school graduates rank 1.38 above regular graduates and the large percent of the year's work represented makes this comparison important. In the Under Class Education work of the junior year normal graduates rank 1.94 below regular graduates, but the

small percents represented make this comparison of little weight. In the Under Class non-Education work of the junior year normal graduates rank C.73 below regular graduates and the extremely high percents represented make this comparison very important. However, when we consider that much of this work on the part of the normal school graduates is required work in the languages, etc., in meeting entrance conditions and is usually taken unwillingly and often irregularly, together with the fact that grades on corresponding work done by regular graduates do not appear in the junior record, it is not surprising that normal school graduates rank lower here. For the total Underclass work of the two years combined normal school graduates rank only a little higher than regular graduates and this alone refutes the argument that normal school graduates rank higher because they take more Under Class work. In fact just the opposite thing seems to have occurred---the greater superiority in the less numerous Graduate and Upper Class hours work has, in the total result, been much lessened by the effect of the lower ranking in the Under Class work.

Finally, then, we must conclude that normal school graduates do rank higher in scholarship, and especially higher in Upper Class and Graduate courses which are supposed

ed to demand greater ability in their mastery.

Problem (2), correlation between scholarship in Education courses and scholarship in non-Education courses, is answered from table 7.

Table 7 shows parallel arrays of Education and non-Education work by grades. In each case the first two (red) horizontal columns represent arrays of regular graduates, the third and fourth (blue) arrays of normal school graduates. Except for the right hand vertical column, the table reads in the same way as table 6. For instance, the first horizontal column reads: In the senior Education courses regular graduates made E grades in 25 hours work, S grades in 296½ hours work, M grades in 645 hours work, I grades in 108½ hours work, and F grades in 2 hours work, representing 2.32, 27.53, 59.85, 10.07, and 0.18 <sup>percent</sup>, respectively, of all their senior Education work, giving weighted results of 103.13 when weighted by the Missouri weights, and representing 35.32% of their total senior work.

From a study of table 7 we get the following conclusions:

- (a) In every case, except in the junior work of normal school graduates, the ranking in non-Education courses is higher than the ranking in Education courses. The probable cause of this exception has been given above.
- (b) In every case the ranking of normal school graduates is higher than the ranking of regular

graduates in corresponding work, the least superiority being in non-Education work of the junior year.

The above results certainly refute the argument that the superior ranking of normal school graduates can be accounted for in the fact that they gain such superiority through taking a larger percentage of Education work in which higher grades are supposedly given. They show that, in whatever kind of work taken, normal school graduates out-rank regular graduates. This superior ranking is greater for Education work in the junior year, but it is greater for the non-Education work in the senior year.

Problem (3), the relative amounts of Education and non-Education courses taken, is answered from table 8.

Table 8 shows, in hours and in percent of total work, the amount of each kind of work taken. The first (red) horizontal column in each case represents the array of regular graduates, the second (blue) that of normal school graduates. The first horizontal column of table 8 reads: In the senior year regular graduates took Education work as follows: 27 hours Extension,  $40\frac{1}{2}$  hours Graduate, 969<sup>hours</sup> Upper Class, and  $40\frac{1}{2}$  hours Under-Class courses, representing 0.88, 1.32, 31.80, and 1.32 percents, respectively, of the total senior work. The Education courses total 35.32% of all their senior work. Other columns are similarly read.

The right hand vertical column in table 8 shows the following relative to problem (3) :

TABLE 8

Amount of each kind of work taken. The first column in each case represents the work of regular graduates.

- Amount in hours--				---Amount in % of total work---					
Extension.	Graduate.	Upper Class.	Under Class.	Extension.	Graduate.	Upper Class.	Under Class.	Total.	
Senior year:-									
Educa- tion.	27	40½	969	40½	0.88	1.32	31.80	1.32	35.32
	6	27	293	62	0.33	1.44	16.20	3.42	21.39
Non-Educa- tion.	8	41½	1063	860	0.26	1.36	34.86	28.20	64.68
	9	39	499½	875	0.49	2.16	27.63	48.33	78.61
Educ. and Non-Educ.	35	82	2032	900½	1.14	2.68	66.66	29.52	100.00
	15	66	792½	937	0.82	3.60	43.83	51.75	100.00
Junior year:-									
Educa- tion.	0	6	554½	113½	0.00	0.20	18.20	3.72	22.12
	2	2	47	21	0.24	0.24	5.74	2.56	8.78
Non-Educa- tion.	3	1	864½	1501½	0.10	0.03	28.45	49.30	77.88
	8	13	174	551½	0.97	1.58	21.25	67.60	91.40
Educ. and Non-Educ.	3	7	1419	1615	0.10	0.23	46.65	53.02	100.00
	10	15	221	572½	1.21	1.82	26.99	70.16	100.18
Junior and senior years combined:-									
Educa- tion.	27	46½	1523½	154	0.44	0.74	25.00	2.55	28.73
	8	29	340	83	0.30	1.10	12.94	3.15	17.49
Non-Educa- tion.	11	42½	1927½	2361½	0.18	0.69	31.65	38.75	71.27
	17	52	673½	1426½	0.64	1.98	25.65	54.24	82.51
Educ. and Non-Educ.	38	89	3451	2515½	0.62	1.43	56.65	41.30	100.00
	25	81	1013½	1509½	0.94	3.08	38.59	57.39	100.00

## I.-- Senior year.

(1) Normal graduates took 21.39% Education.

Regular graduates " 35.32% "

(2) Normal graduates took 78.61% non-Education.

Regular graduates " 64.68% "

## II.-- Junior year.

(1) Normal graduates took 8.78% Education.

Regular graduates " 22.12% "

(2) Normal graduates took 91.40% non-Education.

Regular graduates " 77.88% "

## III.-- Junior and senior years combined.

(1) Normal graduates took 17.49% Education.

Regular graduates " 28.73% "

(2) Normal graduates took 82.51% non-Education.

Regular graduates " 71.27% "

Here we see that for each year and for the two years combined normal school graduates do a greater percent of non-Education courses than do regular graduates. This again refutes the argument that normal school graduates get their higher ranking through taking relatively more Education courses.

Problem (4), the percent <sup>of</sup> Extension, Graduate, Upper Class, and Under Class courses, respectively, taken by each group of graduates, is also answered from table 8, from which the following is taken:

## I.-- Senior year.

(1) Education.

Normal graduates do a greater percent of

Graduate and Under Class courses but less Extension and Upper Class courses than do regular graduates.

(2) Non-Education.

Normal school graduates do more Extension, Graduate and Under Class courses but less Upper Class courses than do regular graduates.

(3) Education and non-Education combined.

Normal school graduates do more Graduate and Under Class work but less Extension and Upper Class work than do regular graduates.

II.-- Junior year.

(I) Education.

Normal school graduates do more Extension and Graduate work but less Upper Class and Under Class work than do regular graduates.

(2) Non-Education.

Normal graduates do more Extension, Graduate and Under Class work but less Upper Class work than do regular graduates.

(3) Education and non-Education combined.

Normal school graduates do more Extension, Graduate and Under Class work but less Upper Class work than do regular graduates.

### III.-- Junior and senior years combined.

#### (1) Education.

Normal school graduates do more Graduate and Under Class courses but less Extension and Upper Class courses than do regular graduates.

#### (2) Non-Education.

Normal school graduates do more Extension, Graduate and Under Class work but less Upper Class work than do regular graduates.

#### (3) Education and non-Education combined.

Normal school graduates do more Extension, Graduate and Under Class courses but less Upper Class courses than do regular graduates.

From the above results we see that normal school graduates do take a somewhat larger percent of Under Class courses than do regular graduates. For instance, 57.39% of normal school graduates' work is Under Class while only 41.30% of regular graduates' work is Under Class. This would seem to justify the argument that normal school graduates get higher grades by taking more Under Class work. However, when we consider the fact, as shown under problem (I) above, that normal school graduates outrank regular graduates little in Under Class work but much in Upper Class work, it becomes quite evident that normal school graduates do not help their ranking by taking the greater proportion of Under Class work.

In fact the Under Class course work pulls down the higher ranking in Graduate and Upper Class courses. This clearly invalidates the argument that higher ranking of normal school graduates comes from Under Class courses.

Problem (5), the correlation between scholarship and age, is answered from table 9.

Table 9 shows parallel arrays of the senior work of the two groups of graduates arranged according to the ages of the graduates. The first horizontal column for each age represents the array of regular graduates. The single horizontal columns represent those ages having representatives in only one group of graduates. The numbering of students is the same as used in tables I and 3. The following shows the number of each student represented in each age group:

Age 20	---	regular graduates	No's. I and 2.
Age 21	--	{ regular graduates	" 3 to 19, inclusive.
		{ normal graduates	" I and 2.
Age 22	--	regular graduates	" 20 to 39, inclusive.
Age 23	--	{ regular graduates	" 40 to 55, inclusive.
		{ normal " "	" 3 to 7, inclusive.
Age 24	--	{ regular graduates	" 56 to 74, inclusive.
		{ normal " "	" 8 to 15, inclusive.
Age 25	--	{ regular graduates	" 75 to 83, inclusive.
		{ normal " "	" 16 to 20, inclusive.
Age 26	--	{ regular graduates	" 84 to 86, inclusive.
		{ normal " "	" 21 to 24, inclusive.
Age 27	--	{ regular graduates	" 87 to 91, inclusive.
		{ normal " "	" 25 to 32, inclusive.
Age 28	--	{ regular graduates	" 92 to 94, inclusive.
		{ normal " "	" 33 to 36, inclusive.
Age 29	---	normal graduate	" 37.

TABLE 9

Array of senior work according to ages of graduates. The upper (red) column in each case represents work of regular graduates.

Age.	----- Hours -----					----- % of each grade -----					Total hours.	Weighted (Mo. wts.)	Weighted by 4, 3, 2, 1 and 0.
	E	S	M	I	F	E	S	M	I	F			
20	0	14	47	2	0	0.00	22.23	74.60	3.17	0.00	63	102.86	
21	29½	186½	305	21	0	5.44	34.45	56.25	3.87	0.00	542	106.23	2.41
	0	10	50½	0	0	0.00	16.52	83.48	0.00	0.00	60½	102.48	2.17
22	59½	174	340	42	4	9.62	28.12	54.90	6.78	0.64	619½	103.02	
23	16½	161½	239½	63	0	3.43	33.60	49.80	13.17	0.00	480½	104.09	2.27
	16½	74	67	4½	0	10.19	45.75	41.40	2.76	0.00	162	109.61	2.64
24	22	138	361	54½	0	3.82	23.96	62.75	9.47	0.00	575½	103.29	2.22
	20	69	131½	16½	0	8.44	29.15	55.45	6.96	0.00	237	105.86	2.39
25	19½	58½	141	32	3	7.67	23.05	55.50	12.60	1.19	254	102.69	2.23
	2	71	81	7	0	1.24	44.16	50.33	4.35	0.00	161	106.43	2.42
26	0	20	80	0	0	0.00	20.00	80.00	0.00	0.00	100	103.00	2.20
	3	33½	93	0	0	2.32	25.87	71.81	0.00	0.00	129½	104.58	2.31
27	0	29	123	8	0	0.00	18.15	76.85	5.00	0.00	160	101.97	2.13
	19	61	156½	8	0	7.77	24.96	64.00	3.27	0.00	244½	105.58	2.37
28	0	9½	35	20	0	0.00	14.72	54.28	31.00	0.00	64½	97.55	1.84
	13	69	48	1½	0	9.89	52.47	36.50	1.14	0.00	131½	110.67	2.71
29	0	19	10	1	0	0.00	63.33	33.33	3.33	0.00	30	108.99	
30	0	22	9	0	0	0.00	70.95	29.05	0.00	0.00	31	110.64	2.71
	27	25	44	0	0	28.15	26.05	45.80	0.00	0.00	96	112.35	2.82
31	0	24	35	2	0	0.00	39.33	57.40	3.27	0.00	61	105.41	2.36
	16	11	3	0	0	53.33	36.66	10.00	0.00	0.00	30	121.49	3.43
32	5	40	81	3	0	3.88	31.00	62.79	2.33	0.00	129	105.46	
33	6	20	5	0	0	19.37	64.50	16.13	0.00	0.00	31	115.49	
34	0	4	29½	0	0	0.00	11.95	88.05	0.00	0.00	33½	101.79	2.12
	3	15	43	3	0	4.69	23.45	67.20	4.69	0.00	64	104.25	2.28

TABLE 9 (continued)

Array of senior work according to ages of graduates. The upper (red) column in each case represents work of regular graduates.

Age.	----- Hours -----					----- % of each grade -----					Total hours.	Weighted (Mo.wts.)
	E	S	M	I	F	E	S	M	I	F		
35(	23	8½	0	0	0	73.00	27.00	0.00	0.00	0.00	31½	125.95
36(	0	19	35	5	0	0.00	32.20	59.40	8.48	0.00	59	103.64
37(	16	5	11	0	0	50.00	15.62	34.38	0.00	0.00	32	117.34
38(	0	11	20	2	0	0.00	33.33	60.60	6.06	0.00	33	109.08
39(	2	24½	41½	0	0	2.94	36.10	61.05	0.00	0.00	68	105.39
41(	0	20	13½	0	0	0.00	59.70	40.30	0.00	0.00	33½	108.95
42(	0	15	11	0	0	0.00	57.70	42.30	0.00	0.00	26	108.65
43(	7	14½	9½	0	0	22.60	46.75	30.65	0.00	0.00	31	113.79
48(	0	3	23	6	0	0.00	9.38	71.86	18.76	0.00	32	98.59
55(	0	0	27	5	2	0.00	0.00	79.40	14.72	5.88	34	91.91

Age 30	--	{ regular graduates	No's.	95
		{ normal	"	38,39,40.
Age 3I	--	{ regular graduates	"	96 and 97.
		{ normal	"	4I.
Age 32	---	normal graduates	"	42,43,44 and 45.
Age 33	---	normal graduates	"	46.
Age 34	--	{ regular graduate	"	98.
		{ normal	"	47 and 48.
Age 35	---	normal graduate	"	49.
Age 36	---	normal graduates	"	50 and 5I.
Age 37	---	normal graduate	"	52.
Age 38	---	normal graduate	"	53.
Age 39	---	normal graduates	"	54 and 55.
Age 4I	---	normal graduate	"	56.
Age 42	---	normal graduate	"	57.
Age 43	---	regular graduate	"	99.
Age 48	---	normal graduate	"	58.
Age 55	---	regular graduate	"	100.

The first horizontal column of table 9 reads: In their senior work those regular graduates who were 20 years of age made S grades in 20 hours of work, M grades in 47 hours of work, and I grades in 2 hours of work, representing 22.23, 74.60, and 3.17 percent, respectively, of all their senior work, and giving weighted results of 102.86 when weighted by the Missouri weights. The weighted results in the right hand vertical column were figured for only those ages represented by work in both groups of graduates.

From an inspection of table 9 we see that only for age 2I do regular graduates rank above normal school graduates,

and this involves the records of only two normal school graduates. By taking only those ages in which each group of graduates is represented by at least 150 hours (approximately the work of five students) we get the following:

A.- Normal graduates versus regular graduates.

- (1) Age 23 - normal graduates are 5.52 superior.
- (2) " 24 - " " " 2.57 "
- (3) " 25 - " " " 3.74 "
- (4) " 27 - " " " 3.61 "

Here we see that for all common ages represented by at least 150 hours work in each group of graduates normal school graduates rank from 2.57 to 5.52 above regular graduates.

B.- Regular graduates only.

- (1) Age 21 gets weighted results of 106.23 .
- (2) " 22 ranks 3.21 below age 21.
- (3) " 23 " 2.14 " " "
- (4) " 24 " 2.94 " " "
- (5) " 25 " 3.54 " " "
- (6) " 27 " 4.26 " " "

Here we see that for regular graduates, (except for age 22) the rank decreases regularly from the highest at 21 to the lowest at 27.

C.- Normal school graduates only.

- (1) Age 23 gets weighted results of 109.61 .
- (2) " 24 ranks 3.75 below age 23.
- (3) " 25 " 3.18 " " "
- (4) " 27 " 4.03 " " "

Here we see that, except for age 25 which is better than age 24, for normal school graduates the rank decreases from the highest for age 23 to the lowest for age 27.

The above results prove that the greater age of normal school graduates does not account for their higher ranking. This is best shown under section A in the above lists. In sections B and C we see that for each group of graduates there is in general a negative correlation between age and scholarship, the highest ranking for regular graduates being for age 21 and for normal school graduates 23.

Problem (6)' correlation between scholarship and amount of teaching experience, is answered from table IO.

Table IO shows the arrays of senior work according to amounts of teaching experience at the time of graduation. The first (red) horizontal column in each case represents the array of regular graduates. The following students' numbers show what students' records are included under each amount of experience:

No experience includes

(a) Regular graduates -- 1 to 16, 18 to 33, 37 to 48, 52 to 54, 56 to 66, 73 to 79, inclusive in each case, 82, 83, 87, 91 and 92.

(b) Normal school graduates -- 1, 3 and 25.

$\frac{1}{2}$  year experience includes regular graduate No. 88.

1 year experience includes

(a) Regular graduates -- 17, 34, 49, 67, 68, 69, 70,

Folded page: See supplemental file Table 10 for unfolded version.

80,84 and 100.

(b) Normal school graduates -- 8,14 and 26.

2 years experience includes:

(a) Regular graduates -- 35,50,51,89,96.

(b) Normal graduates -- 4,5,9,10,13,19,21.

3 years experience includes:

(a) Regular graduates -- 36,55,71 and 94.

(b) Normal graduates -- 7,11,16,22, and 27.

4 years experience includes:

(a) Regular graduates -- 81,85,86 and 93.

(b) Normal graduates -- 6,15,17,23,24,28 and 37.

4½ years experience includes normal graduate -- 12.

5 years experience includes:

(a) Regular graduates -- 90 and 97.

(b) Normal graduates -- 18,20,33 and 36.

6 years experience includes, <sup>(a)</sup> regular graduate -- 72.

(b) Normal graduates-- 29,30,31,34,35,38,45,46.

7 years experience includes normal graduates-- 2,39,  
41 and 47.

8 years experience includes:

(a) Regular graduate -- 98.

(b) Normal graduates -- 32 and 50.

9 years experience includes normal graduate -- 53.

10 years experience includes:

(a) Regular graduate -- 95.

(b) Normal graduates -- 42,43, and 51.

11 years experience includes normal graduates -- 40,44.

12 years experience includes normal graduates -- 49,52.

13 years experience includes normal graduate -- 48.  
 15 years experience includes normal graduate -- 54.  
 17 years experience includes normal graduate -- 57.  
 18 years experience includes normal graduate -- 56.  
 19 years experience includes normal graduates-- 55,58.  
 20 years experience includes regular graduate-- 99.

It will be noted that number 12 of normal graduates was omitted from the table by mistake. This person had  $4\frac{1}{2}$  years experience, took no Education courses in the senior year, and attained weighted results of 110.31 in non-Education work. This result is seen to be almost identical with results for 4 years experience (110.23), so its omission does not affect the comparisons.

The first horizontal column of table 10 reads: In their Education courses those regular graduates who had no teaching experience made E grades in 25 hours work, S grades in 203 hours work, M grades in  $491\frac{1}{2}$  hours work, I grades in 81 hours work, and F grades in 2 hours work, representing 3.10, 25.30, 61.25, 10.09, and 0.25 percent, respectively, of their total  $802\frac{1}{2}$  hours Education work, and giving weighted results of 102.95 when weighted by the Missouri system. The table reads similarly for the non-Education work.

The work of the two groups of graduates is so scattered over the different amounts of experience that it is difficult to find a satisfactory basis for comparing the rankings for any one amount of experience. There is only one amount of experience (2 years) in which work of as much as

five students is represented. For this amount of experience there are barely five records of regular graduates and seven records for normal school graduates. Therefore, it seems best to compare results in those cases of experience where at least 30 hours of work are represented in each group of graduates. It is recognized that this is too low a minimum to prevent a few exceptional records in a particular group from distorting the probable standing for such an amount of experience. The conclusions should be read with this limitation in mind. The following results and conclusions are based on comparisons of standing in cases represented by at least 30 hours work in each group:

A.- Normal graduates versus regular graduates.

I.- Education courses.

- (1) No experience: Normal school graduates in  $34\frac{1}{2}$  hours work (3 students) rank 0.85 above regular graduates in  $802\frac{1}{2}$  hours work.
- (2) 2 years experience: Normal school graduates in 34 hours work (7 students) rank 3.22 above regular graduates in 52 hours work (5 students).
- (3) 3 years experience: Normal school graduates in 32 hours work (5 students) rank 0.96 above regular graduates in 58 hours work (4 students).
- (4) 0 to 20 years experience: Normal school graduates in 388 hours work rank 2.88

above regular graduates in 1077 hours work.

II.--Non-Education courses.

- (1) No experience: Normal school graduates in 56 hours work (3 students) rank 1.68 below regular graduates in 1324½ hours work.
- (2) 1 year experience: Normal school graduates in 74 hours work (3 students) rank 3.18 below regular graduates in 206½ hours work (10 students).
- (3) 2 years experience: Normal school graduates in 175 hours work (7 students) rank 1.29 below regular graduates in 102 hours work (5 students).
- (4) 3 years experience: Normal school graduates in 129 hours work (5 students) rank exactly with regular graduates in 52 hours work (4 students).
- (5) 4 years experience: Normal school graduates in 178 hours work (6 students) rank 3.01 above regular graduates in 116½ hours work (4 students).
- (6) 5 years experience: Normal school graduates in 117 hours work (4 students) rank 3.60 above regular graduates in 58 hours work (2 students).

(7) 0 to 20 years experience: Normal school graduates in 1390½ hours work rank 2.99 above regular graduates in 1972½ hours work.

The above results seem to indicate that, for any common amount of experience, normal school graduates rank above regular graduates, in Education courses, though the difference in rank is small in most cases.

The comparisons for non-Education courses are more difficult. In the first three listed cases normal graduates rank some below regular graduates, while in the fifth and sixth cases they rank considerably above regular graduates. The complexity is increased by the fact that few normal school graduates' records are found in the first three listed cases and few regular graduates' records are found in the fifth and sixth cases. The cases are too scattering to warrant a conclusion, though it seems in general that rankings are about equal for common amounts of experience.

B.- Regular graduates only.

I.- Education courses.

<u>Experience</u>	<u>Rank</u>	<u>Hours</u>	<u>Students</u>
none -----	I02.95	--- 802½	----- 70
I year -----	I00.78	--- 86	----- 10
2 years -----	I06.05	--- 52	----- 5
3 years -----	I04.66	--- 58	----- 4
0 to 20 yrs.	I03.13	--- I077	----- I00

## II.- Non-Education courses.

<u>Experience</u>	<u>Rank</u>	<u>Hours</u>	<u>Students</u>
none -----	I04.89 ---	I324½ ----	70
I year -----	I00.95 ---	206½ ----	I0
2 years -----	I08.25 ---	I02 ----	5
3 years -----	I03.32 ---	52 ----	4
4 years -----	I07.27 ---	II6½ ----	4
5 years -----	I03.09 ---	58 ----	2
0 to 20 years-	I04.79 ---	I972½ ----	I00

In the two sets of tabulations above it will be noted that there is shown little correlation between experience and scholarship. For instance, in Education those having no experience rank only 0.18 below the standing of the whole group, and in non-Education courses those having no experience rank 0.10 above the standing of the whole group. I think this is clear proof that experience had little effect upon the scholarship in the group of regular graduates.

## C.- Normal school graduates only.

## I.- Education courses.

<u>Experience</u>	<u>Rank</u>	<u>Hours</u>	<u>Students</u>
none -----	I03.70 -----	34½ -----	3
2 years -----	I09.37 -----	34 -----	7
3 years -----	I05.62 -----	32 -----	5
4 years -----	I07.33 -----	45 -----	7
6 years -----	I06.82 -----	60½ -----	8
0 to 20 yrs.-	I06.01 -----	388 -----	57

## II.- Non-Education courses.

<u>Experience</u>	<u>Rank</u>	<u>Hours</u>	<u>Students</u>
none -----	I03.21	----- 56	----- 3
1 year -----	97.77	----- 74	----- 3
2 years -----	I06.94	----- I75	----- 7
3 years -----	I03.32	----- I29	----- 5
4 years -----	I10.28	----- I78	----- 7
5 years -----	I10.69	----- II7	----- 4
6 years -----	I08.45	----- I86½	----- 8
7 years -----	I14.61	----- II6	----- 4
8 years -----	I01.77	----- 51	----- 2
10 years -----	I07.38	----- 65	----- 3
11 years -----	I10.68	----- 45	----- 2
12 years -----	I18.57	----- 42	----- 2
19 years -----	I05.24	----- 53	----- 2
0 to 20 yrs.--	I07.78	----- I390½	----- 58

In the above tabulation of Education courses it will be noted that students of 2 years experience rank above all others here listed and considerably above the standing of all normal graduates in Education courses. Those of 3, 4 and 6 years experience also rank high and, except for those of 3 years experience, rank higher than the standing of all normal graduates in Education courses. The students of 2, 3, 4 and 6 years experience include almost half of the normal graduates. Only 6 had less than 2 years teaching experience. The above comparisons show that there is no positive correlation between scholarship in Education courses and amount of teaching experience. In fact, they seem to suggest the possibility of a negative correlation.

The tabulation of non-Education courses

seems to indicate, on the face of it, that there is considerable correlation between teaching experience and standing in non-Education courses on the part of normal school graduates. However, a closer analysis will show the correlation to be small. For instance, the standing for the combined work of the 23 graduates of 2,3,4 and 5 years experience is a little above the standing of all normal school graduates. Again, it will be noted that the extremely low ranking of the 3 graduates of one year experience is largely responsible for the relatively lower ranking of those under 6 years experience. Taking these two facts into consideration, we must conclude that this study shows little or no correlation between experience and scholarship in non-Education work.

In conclusion to problem (6) we may say that for regular graduates there seems to be no noticeable correlation between experience and scholarship, while for normal school graduates there seems to be a slight negative correlation in Education courses and possibly a slight positive correlation in non-Education courses. The previously mentioned limitations of this part of the study need to be held in mind in connection with the above stated conclusions. The comparisons under section A of problem (6) answer the

argument that normal school graduates attain higher rank because their greater amount of teaching experience aids them in Education courses. From this study it seems that those of greater amounts of experience really rank slightly lower in Education courses than students of the same group but with less experience. It is further shown that for each extensive amount of experience represented in each group normal school graduates outrank regular graduates, though not so much as for the total Education work in each group. It is also shown that for common amounts of experience normal school graduates in non-Education work rank little, if any, above regular graduates. This, it seems, may account for some of the superiority on normal school graduates in non-Education courses. The very large proportion of non-Education courses taken by normal school graduates makes this statement significant. In general I think we may safely say that experience has been a factor in giving relatively higher rankings to normal school graduates, but contrary to what would be expected, the non-Education courses seem to have gotten most of the benefit accruing from such experience.

### General Conclusions

This study has shown that normal school graduates do rank higher in scholarship than regular graduates. It has shown that this higher ranking can not be accounted for by the argument that normal school graduates take relatively more Education courses and thereby get higher grades. It

has also shown that the relatively greater proportion of Under Class courses taken by normal school graduates does not account for such standing. Further, it has shown that the higher ages of normal school graduates can not account for their superior ranking. Finally, it has shown that the greater amounts of teaching experience on the part of normal school graduates accounts for little, if any, of their superiority in rank.

In interpreting the meaning of differences in rank as used in this study the following considerations should be borne in mind:

In the first place, the weights for the grades E, S, M, and I differ by 15 points -- ie, E gets a weight of 15 points more than S, S gets a weight of 15 points more than M, and M gets a weight of 15 points more than I. This means that an S record is one step or 15 points better than an M record, that an E record is one step or 15 points better than an S record, etc., when we assume the steps between the grades E, S, M, etc., to be equal. Hence, weighted result 115 means one step better than weighted result 100.00; weighted result 110.00 means 1/5 of a step better than 107.00; weighted result 104.00 means 1/15 of a step better than 103.; etc. On page 16, section (f), it is stated that for the total two years' work normal school graduates outrank regular graduates by 2.76. This means that they rank 2.76 points, or  $2.76/15$  (0.184) of a step higher than regular graduates.

In the second place the number of cases in each group are comparatively small, varying from 1 to 19, with the typical group from 6 to 8. This makes a large probable error as is shown by the following examples. For instance, 19 regular graduates of age 24 average 103.3 with a probable error of 2.5. The 8 normal school graduates of the same age average 105.8 with a probable error of 3. Thus one half of the regular graduates would lie between 100.8 and 105.8, while one half of the normal school graduates would lie between 102.8 and 108.8. The 9 regular graduates of age 25 average 102.7 with a probable error of 4.8; the 5 normal school graduates of the same age average 106.4 with a probable error of 3.8. Here one half the regular graduates would lie between 97.9 and 107.5, while one half the normal graduates would lie between 102.6 and 110.2. Again, 5 regular graduates of age 27 average 101.9 with a probable error of 0.6, and 8 normal school graduates of the same age average 105.5 with a probable error of 3.2. Thus one half of the regular graduates would lie between 101.3 and 102.5, while one half of the normal school graduates would lie between 102.3 and 108.7. These wide spreads and small numbers qualify the reliance to be placed upon numerical relationships shown throughout the study.

In the third place, it must be borne in mind that students are only roughly graded according to merit in that those that lie closest to .85, 1, 1.15 and 1.30 are thrown into classes I, M, S, and E. This might easily make it possible that relative standing based upon the grades would not correspond with relative standing based upon actual merit.

For instance, a group of 3 students with true merit designated by 85, 94, and 110 would on the basis of true merit average  $96 \frac{1}{3}$ , but since they would be given grades of I, M, and S, they would receive upon the basis of grades an average of 100. Another group of 3 students with true merit indicated by 92, 94, and 106 would have a true average of  $97 \frac{1}{3}$ , but when given the grades of I, M, and M their average would be  $97 \frac{1}{3}$ . On the basis of true merit the second grade exceeds the first; but on the basis of grades the first exceeds the second in merit. Hence we see that the differences of merit of groups based on true standing in some cases may be the reverse of the standings determined by the grades.

These three considerations seem to lead to the final conclusion that the standings of the normal school graduates of these two years are at least not inferior to those of regular graduates, and the probabilities are that they are slightly better.

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