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A Comparison of Academic Achievement Between Pupils of Selected Small Elementary Schools and Large Elementary Schools in Box Elder County

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A COMPARISON OF ACADEMIC ACHIEVEMENT BETWEEN PUPILS OF SELECTED SMALL ELEMENTARY SCHOOLS AND LARGE ELEMENTARY SCHOOLS IN BOX ELDER COUNTY

by

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Robert W. Morgan

TABLE OF CONTENTS

LIST OF TABLES

INTRODUCTION

The Constitution of the United States brought a "new look" throughout the western world toward the position the American school was to play in the protection of the cherished and newly won freedoms. Congressional action, backed by majority public opinion, legally bound the responsible power of school maintenance and operation over to the state and local governments. It was believed that the first line of defense for the protection of democracy lay in the foundation of good schools, and their activities could be best augmented by the strong support of the family community life cooperatively working for the welfare of a united local, state and national government. This idea coupled with other material controls such as transportation, finance, and other limiting economic factors brought about the desire to establish within walking distance a public school for every child of school age residing within the territorial boundaries of this country. Thus the district, or ungraded one-teacher school, was born at a time when life was simple, families large, roads new and poor, and when education beyond the simplest rudiments was looked upon as somewhat of a luxury, but still a vital necessity to the development of this, then, "spawning" country. The small school was created to meet an immediate need. It has rendered an inestimable social and scientific contribution to the American way of life. For 200 years its social importance has paralleled that of the church and the home.

Scientific and social development, industrial expansion, and population growth have added intricate complexities to the art and science of

living. With complexities come problems, critical thinking, changing ideas, and changes in the way of living. America's schools have not escaped the impact of these changes. The idea of consolidation has appeared in the philosophy of school administration as a means of efficiency, and two sides of conflicting thought have arisen over the respective values of the small community school and the large consolidated school. This is well described by Goodykoontz: (11, p. 5)

> Many educators and laymen believe that the chief hope of solving the problems of rural education lies in displacing as rapidly as possible the small schools by larger graded schools, centrally located. Persons belonging to this school of thought argue that only a large school with several teachers and a large, well equipped plant, can effectively and economically provide the various educational services demanded of a balanced program of education and keep pace with the growing complexity of modern society.
>
> There is a second school of thought which is not so eager to see the passing of the small schools. People holding this view are convinced that smaller rural schools can provide as good an educational experience to the rural child as a larger school. They point out, moreover, that these smaller schools are the chief means of keeping the vital function of education near to the favorable community centered life and accessible to the rural child.

For 70 years the educational leadership in Utah, backed by the state legislature and Supreme Court, has advocated the consolidation of small adjoining schools and school districts. "School consolidation" has become a remedial shibboleth in the search for solutions of school problems over the entire nation. However, consolidation in many cases has met stiff resistance, and this resistance has impeded the spread of consolidation to all areas.

This strong resistance from both minority and majority groups has aroused the interest of the writer as to why people should resist something that is supposed to be a good thing. Is the education in a larger

school better than that which pupils receive in a smaller school? This subject is one of a strict controversial nature, and an attempt will not be made to prove the superiority of either large or small elementary school. An objective effort will be made to shed more light on both types. The problem will be to study the academic success of pupils in selected large elementary schools as compared to the success of those in selected small elementary schools, for the purpose of annotating any possible difference of educational opportunity that may exist between large and small elementary schools in Box Elder County.

It is not the purpose of this study to propound conclusive evidence; however, it is hoped that from an administrative viewpoint the findings will reveal pertinent suggestions in equalizing educational opportunities in the Box Elder County School District.

REVIEW OF LITERATURE

The literature pertaining to this study is relatively abundant; however, its content is contradictory as to which type of elementary school, large or small, offers the best educational opportunity to its pupils.

In defense of the small schools, the American Association of School Administrators says that it is a fallacy to assume that a small school must necessarily be a poor one. Such an assumption was perhaps influenced by the decades of rapid industrial expansion and a belief that city life was superior to that of the rural life, supported by the mass migration of rural people to the city. Size, number, and quantity frequently became the criteria of success in American life. Nor has education escaped the pressure of these forces. Too often educators, like others, associate bigness with goodness and attempt to adapt all school situations to the environment of "consolidated bigness."

Success today is often measured by enrollment, size of plant, and the number of procedures similar to those employed in large places. Textbooks have been adopted, classroom procedures have been instituted, and administrative regulations have been defended with no better reason than "all the big cities are doing it." In the investigation of the literature the use of the term "small school" was found to lack definiteness in terms of total enrollment per school. However, in this study a school with an enrollment under 160 pupils will be classified as a small school, and a school with an enrollment over 160 pupils as a large school.

The advantages of the small elementary school

The following list of advantages in support of the small community school has been drafted by the Association of Administrators: (22, pp. 37-42)

1. Opportunity for intimate acquaintanceship among pupils, parents, and teachers which if recognized may lead to a more cooperative fulfillment of the joint responsibilities of school and home in promoting all-round growth of boys and girls.

2. There is a possibility of a prolonged period of contact between pupils and teachers which, if provided, will furnish an advantage in facilitating continuous directed growth.

3. The total learning environment can be more readily capitalized in a small community.

4. Frequent opportunity for group action of the entire school can lead to self-realization and to the development of desirable social traits.

5. The school in the small community provides greater opportunity for democracy in administration, supervision and teaching.

In all cases where the term "small community" was referred to in the literature reviewed, the description indicated a small rural community without definiteness as to exact population size. To give the above term a more exact numerical identity, a community with a population less than 1,500 citizens will be classified as a small community, and a community with a population of over 1,500 citizens as a large community.

Edwards (7, p. 270) supports the belief of the American Association of School Administrators by citing some criteria of a community school that could be consummated where fewer pupils were involved. A school-community program should be specific enough in nature to make its influence felt on the individual; therefore, the school must learn about such factors affecting the home life of the elementary pupil as:

(1) cultural and educational background of parents, (2) emotional tone of home life, (3) economic status, (4) health conditions, (5) spiritual life, (6) work and study habits, (7) his range of reading interest, (8) work experience in the community, (9) special interests, and (10) family recreation.

Wofford (26, pp. 166-168), Seay (23 pp. 486-488), and Herd (14, pp. 60-63) consider a certain type of consolidation as a barrier to the development of the small community school. It is possible to merge the administrative units to a high degree of economic and administrative success by providing a more effective administrative and supervisory staff, an equalized tax burden, effective recruitment, well planned in-service education, and flexibility in organization of the training program. On the other hand, the consolidation of two or more attendance units into one large attendance unit may create a situation which definitely thwarts the development of the community school. Such reorganization may lead to the development of a school with a very large enrollment but with no sense of community belonging, a school with extensive diversification in program but with little concern for general education, a school with high idealism with respect to national and international goals but with a record of achieving only superficial understandings since it has no real community to which it can relate its geographic concepts, a school that is emotional over the role of community life but actually sees this role as a nostalgic exercise with no reality of experience.

In the upward trend of consolidation there has been some inappropriate use of the term "community school", with the idea in mind on the part of administrators to sell consolidation to the people with a thought that the intimate values of a small school can be still maintained in a

large school. Morgan (18, pp. 11-14), in agreement with the findings of Wofford, Seay and Herd as concerns distortions of the value of the word "community" when applied to consolidation, indicates that a vital segment of our wholesome society is being destroyed by the process of school reorganization. Too often a confusion of words can allow the word "community" to be transfigured from the bioligist's community of bacteria to a city with a population greater than some nations. "Community" is made to wear whatever the schoolman wants, and so our small schools are experiencing a popularity recession because of implications involving the true virtue of the term "consolidation." The true meaning of the word "community" as it pertains to this study involves only the small rural communities maintaining one-teacher to five-teacher schools.

Morgan insists that we cannot retreat from the trend in school consolidation, that the school has to follow the trend. Most deterioration results from following trends; much of social advance is won by defying and reversing trends. Thanks to the developing recognition of the small community among leading educators, peremptory dealing with small communities is beginning to give way to wise recognition of local decision and of the importance of small community settings for our schools. (18, pp. 11-14)

Woodring (28, pp. 20-23) and Edwards (7, p. 270) agree that being larger does not necessarily make a school better. Many mistakes all over the country are being made in constructing larger consolidated schools such as: (1) locating a new school in town instead of in the country, (2) covering the playground with asphalt, (3) providing a steel Jungle Gym instead of trees to climb, (4) thinking a teacher who handles only one grade can adequately supervise the work of 40 to 45 children while

the teacher at the country school had three grades with only 15 children, and (5) gearing the after-school activities to the city child and not allowing for the family duties of the country child.

If consolidation seems impractical because of distance and does not fit the virtue of education desired in a particular community, it does not mean that citizens of such a community have to be satisfied with a poor school. A good teacher, a modern building, and some essential equipment make it possible for the small school to provide an excellent elementary education, particularly if there are not too many children.

The foregoing discussion contains some good arguments on the side of the small elementary school, in spite of the ever-increasing trend toward the consolidation of small schools.

The advantages of the large elementary school

The small school district was brought to Utah from New England by the Mormons and was the established plan of school organization for 50 years. In many cases a true sentimental value becomes attached to the "little red school house," and its praises have long been sung until it is no wonder its inadequacies have become a paradox to the "nostalgic mind" of the supporting citizen.

Our ever-changing state financial structure and more complex way of life have made it necessary for the sake of efficiency to consolidate our schools in some instances. The state school report indicates that for 70 years the educational leadership in Utah has advocated consolidation of small adjoining schools. The state school office is continuing to make increased consolidation. The Supreme Court has instructed the State Board of Education that it is the state's duty to support local boards in continued school consolidation. The state legislature in 1905 passed a law

making consolidation optional to all school districts throughout the state and in 1915 enacted legislation making the same condition mandatory (17, pp. 65-66), (2 pp. 37-40).

Rufi (19, p. 5) in a very logical statement of criticisms of the small rural schools says:

> With reference to teachers, it is charged that a large majority of them have had little or no previous experience, that the training is woefully inadequate, their tenure extremely brief, their salaries insufficient, their professional spirit low -- in short, that in practically every important qualification they are far below the standards reached by the staffs of the larger urban schools.
>
> In connection with administration and supervision it is claimed that these schools are poorly organized and administered, records are incomplete, attendance irregular, the cost per pupil is exorbitant, the districts too small to allow enough taxable revenue. The physical plants in the majority of cases are unsafe, unsightly, unsanitary, and educationally unserviceable. They are poorly ventilated, ill lighted, and have almost no facility for health education.

Although the above quotation is inspired more by the woeful conditions of education existing in the central part of the nation and fits the description of both the small high school and elementary school, it does pertain to some of the Utah schools existing in isolated and remote areas.

Glenn (10, p. 28), Betts and Hall (3, pp. 228-230), Yapple (29, pp. 39-42), and Kimber (15, pp. 61-64) have all contributed to the following summarized list of advantages favoring the large elementary school over the small elementary school:

1. Provides more favorable extra-curricular activities
2. Cuts down on waste evident in small classes
3. Allows grading of pupils into classes according to ability
4. Provides better distribution of teaching time
5. Allows extension of curriculum
6. Provides better buildings and equipment
7. Provides facilities for new subjects
8. Attracts better teachers

9. Provides better supervision
10. Cuts down on pupil drop-outs
11. Gives opportunity for development of skills in manual arts
12. Provides better opportunity to exercise educational and vocational guidance
13. Provides better athletic and physical education facilities.
14. Provides a wider parent interest in school activities
15. Pools talent of a number of towns for improvement
16. Provides better adult-education facilities
17. Provides better opportunity for the development of a music and art program by special teachers
18. Provides better library facilities

For some the above summary would stand unchallengeable as evidence for complete abolition of small schools; however, there is reason in all things, and Strayer (24, p. 116) gives a reasonable judgment to follow in employing consolidation.

> Centralizing tendencies should be encouraged when they attempt to insure adequate financial support, competent personnel, necessary physical equipment, and essential school organization.

> We must continue to offer equal opportunity to the children. This means that every effort must be made to continue the principle of providing that the burden fall equally upon all parts of the state and education adjusted to the needs of all types of children. We must remember that equality of opportunity is not identity of opportunity, and that people who differ are not likely to receive equal consideration if they are all treated in the same way.

The destiny of our future school systems has in some instances been shaped by a condition of "ego combativeness" employed on the part of pressure groups rather than by objective reason. This may or may not be healthy for the welfare of our schools. In cases of this kind reason is sometimes over-shadowed by the selfish desire of one group to win over the other for the sake of winning. Henry (13, pp. 89-91) reports a condition of this kind that occurred in Orlando Park, Illinois. A conservative group helped defeat two-to-one a board proposal to consolidate Orlando

Park High School with an adjacent Palos High School District. When the conservative group requested of the board that a new high school be built in Orlando Park, immediately the Junior Women's Club, inspired by the superintendent of schools, formed a vigil supporting the board's original plan of consolidation, and one year later turned the tables with the citizens on the original defeat by the same voting score of two-to-one in favor of consolidation. The voting had changed emphatically, but surely the principles had not. Morgan (18, pp. 11-14) indicates that professionally manipulated relationships of this type between school and community can be more harmful than crude dictation. Techniques used to professionally manipulate and assert a given way upon the public often duplicate the processes employed by totalitarian governments to organize communities to their end.

To minimize future occurrences of situations of this kind, it would perhaps be wise to compromise and select the best contributions from both sides. The Council of State Governments (25, pp. 51-52) offers the best compromise the writer was able to find regarding criteria for a properly organized school district:

1. Contains at least one well-defined community or a number of interrelated communities
2. Has the pupils and resources to offer a comprehensive program of education from kindergarten through high school
3. Is able to procure capable educational leadership
4. Is able to maintain a competent, well-balanced staff of teachers, supervisors, and specialists
5. Can finance its school program without unduly burdensome taxes
6. Locates schools in regard to:

a. Bringing together enough children to make good instruction possible at reasonable cost

b. Placing schools in neighborhood or community centers

c. Holding transportation time for children to one hour

7. Is of such size and so reorganized that all people in the district can exercise a voice in selecting school board officials and developing the educational program.

Russell (21, pp. 17-23) suggests a centralization of administrative units, or "externals", and a decentralization of the "internals", or attendance units. "External" deals with construction of buildings, keeping the buildings clean and repaired, and purchasing all equipment, etc. "Internal" has to do with what is taught, how it is taught, and the life and spirit of the school, etc. Russell adds,

> ...the division of school administration points the way to the solution of the American problem. We need centralization to provide equality; we fear centralization as a menace to our liberty. Very well! Let us agree to centralize the "externals", reserving to the localities complete control over the "internals."

Comparative studies

The comparisons between rural and urban educational achievement appear to reflect variation in findings in accordance with what would be expected by comparing pupils coming from so many different environments. These studies have a tendency to favor the urban pupil, but a failure to consider the ability of the pupils, insofar as it is possible for a mental test to perform this task, was apparent in the majority of the studies. Henry (12, pp. 38-41) compared a group of rural and city children at the high school level who had had their elementary instruction in the small rural school and the consolidated larger city school. He found after administering the Terman Group Test for Mental Ability

and Haggerty Reading Examination to the ninth through the twelfth grade classes that all data taken together indicated that rural pupils are older at entrance to high school, that they make poorer scores on the intelligence and achievement tests, but that they earn approximately the same grades in all subjects taught in the high school.

The rural pupils had a 10.3 lower mean I.Q. than their city peers and yet equalled them in high school grade marks. This difference suggests the possibility that a stronger elementary education could have been afforded the rural pupils. Havighurst (8, pp. 20-21) logically explains that the elementary educations did not differ, but that possibly items used in the intelligence test favored the city pupil. An inspection of commonly used intelligence tests reveals that the problems of these tests are not limited to the common cultural experience shared by the majority of American boys and girls, but instead are largely drawn from the cultural experience of the middle-class boy and girl who constitute a minority group, If this is so, it is then probably reflected in the above 10.3 lower mean I.Q. indicating a cultural disadvantage on the part of the rural child to achieve equally as well on an intelligence test. This disadvantage seemed to disappear as the two groups were integrated in high school.

Another study of comparative achievement between rural and urban elementary students compares arithmetic, English, geography, reading, spelling, and United States history. The mean marks were statistically significant and indicated that the urban group excelled the rural group in every subject. In general, the girls in both the village and the rural schools excelled the boys. The exceptions were in the United States history in the village schools, and in arithmetic and geography

in the rural schools. (5, pp. 269-272)

The above study indicates a statistically conclusive favor toward the large school pupils. This might typify one section of the country with its given set of environmental particulars; therefore, it might reverse itself in another section of the country.

May (16, pp. 36-38) conducted a study in Crawford County, Illinois, comparing achievement of rural and urban pupils. He found the median age of the rural group was 14 years, 8.9 months, and that of the urban group was 14 years, 6.6 months. On the Terman Group Test of Mental Ability, the median I.Q. of all rural pupils was 95.6, while for the urban group it was 99.3. May thought the difference to be significant and attributed it to the past experience of the urban pupils. On the Stanford Achievement Test the differences were slight with the exception of reading and spelling; here there was a decided difference in favor of the urban children. In arithmetic, language, and nature studies the results were closely the same but slightly in favor of the urban pupils.

If May had taken into consideration the difference in the I.Q. means of the two groups, which would indicate a one-fourth to a one-half grade expected lower achievement on the part of the rural students, the differences perhaps would not have been due to inadequate educational opportunity.

The results of another study conducted in Texas concerning the child of the Texas one-teacher school suggests a possible reason why the rural child could be inferior to the urban child in ability, if an inferiority does exist. Blanton (4, pp. 89-91) shows that pupils in one-room schools are markedly inferior to urban pupils in native ability insofar as that ability is revealed by mental tests, that their achievement

in school subjects is decidedly lower, and that their socio-economic status is below that of city children. The superior socio-economic attraction of the city has lured the most capable from the rural area. Natural selection has left those in the country of inferior ability.

The above study was conducted in 1926. The past 20 years has, more or less, partially urbanized the rural areas by extension of public utilities, construction of roads, and the advent of television. The city has in many respects been moving back to the country. Also, native ability is a hidden factor until discovered. Many of the people remaining in the country at that time while their so-called "efficient cousins" migrated to the city perhaps chose to do so not because of an inferior ability, but because of the philosophical and religious value they placed on the ideal of the country life. The neighborly, easy-going life of the country might have a retarding effect upon a pupil's desire to competitively perform academically; but if the same children were subjected to the faster, more naturally competitive way of doing the more complex things availed by the city culture, their induced desire to compete, because of environmental change, might accelerate their academic achievement greatly. Russell and Twinning (20, pp. 18-20) spoke of this condition in mentioning that reading ability was more influential in determining mental age than non-language ability, as a national intelligence test investigation had shown. The reason for the rural children so often falling below urban children in intelligence test scores may be that their lack of facility in reading and language usage functions interferes with their success.

Baldwin (1, p. 235) supports the above findings of Russell and Twinning. In comparing rural and city babies matched in age, he found

no significant difference in intelligence. However, the tests he used showed the rural children at the age of five or six inferior to those of the city. The rural children showed marked inferiority in areas requiring certain responses to pictures involving discrimination, and necessitating understanding of verbal directions. Baldwin pointed out that the small number of books in the rural homes, and the consequent lesser experience in looking at pictures, might have made these tests more difficult for the rural children, and that inferior language development might also be a factor of inequality. Thus the scores might be attributable to "limited environment" and a certain lack of training rather than to any native intellectual deficiency.

Dunn (6, p. 82) very effectively supports the "limited environment" theory.

> It cannot be too strongly emphasized that tests do not measure intelligence directly, but only the product of intelligence interacting with the experiences afforded by the environment.
>
> The products of intelligence and experiences are acquired abilities to do many kinds of things -- talk, build, cut; fit blocks into spaces; dress and undress one's self; see relations of cause and effect; observe likenesses or differences in pictures, objects or words; judge right from wrong; memorize rhymes, sing, play games, and, after school years begin, read, write, compute, and acquire many facts from books. So two children, starting life with the same degree of intelligence, may at a given age have developed differently in knowledge, understanding, or skill because their experiences have been different in nature, variety, and extent.

To further support her belief, Dunn has cited an experiment conducted by Shimberg (6, loc. cit.) on the influence of environment who compared the scores of rural children with scores of urban children on a closely similar test with diametrically opposite results. The two tests were so much alike that a group of rural supervisors who examined both were not able to discover what parts of them were favorable or unfavorable to the

country children's experience.

One of the most accurate studies of an achievement comparison was conducted by Russell and Twinning (20, pp. 18-20) when they compared achievement in certain urban and one-teacher rural schools in Kansas. They were exceedingly cautious in equating the groups of pupils to be studied according to mental age, chronological age, and grade to insure equal ability to do school work. Achievement tests were administered and the results were that in the fourth grade, achievement efficiency seemed to favor the urban students; the superiority was, however, not great. In the eighth grade the efficiency advantages rested with the rural students, and the differences were not of significant meaning.

DELIMITATIONS OF TERMS

1. "Group L" comprises the two large elementary schools located in a semi-urban area in the Box Elder County School District which represents one-half of the pupils in the comparison.

2. School L-1 is a 17-teacher city elementary school having a regular enrollment of approximately 650 pupils and is located in the same town as its "group L" partner, School L-2.

3. School L-2 is a 14-teacher city elementary school in "group L" having an enrollment of approximately 450 pupils and is located in the same town as School L-1.

4. School S-1 is a five-teacher rural elementary school having an enrollment of 160 pupils, and is included in the "group S."

5. School S-2 is a four-teacher rural elementary school having an enrollment of 95 pupils, and is included in "group S."

6. School S-3 is a three-teacher rural elementary school with an enrollment of 76 pupils, and is included in "group S."

7. School S-4 is a two-teacher rural elementary school with an enrollment of 35 pupils, and is included in "group S."

8. This comparative study of academic achievement of rural and urban, or large and small school pupils, included the sixth grade classes of the 1954-55 school year from all the respective schools included in the study.

9. In order for a reader to formulate a clear vision of the schools involved in this study and thus be better able to understand the environment of the pupils, a brief description of community life is considered desirable at this point.

Pupils in "group L" live in a semi-urban city where a combination of livelihoods are followed in industry, professional work, business, manufacturing, and agriculture. A library and various cultural centers are available for pupil use. Three very modern elementary schools, and one consolidated junior high and and senior high school are located in fairly convenient places. The schools are staffed with an average to excellent group of teachers, and adequate instructional material is available to carry on a complete modern school program. Most of the teachers have established themselves as permanent residents of the community and own their own homes. As a result, the teacher turnover is less in the schools of "group L" than in the schools of "group S." Effective playground material and activity rooms are included in all three elementary schools. A football field, a modern gymnasium, a track and a swimming pool compose the athletic facilities at the junior and senior high schools. All possible channels of extra-curricular pursuit can be fully exploited in favor of cultural growth on the part of the pupils. This "group L" community is rather prosperous and does have considerable socio-economic stratification, but this does not have a detrimental effect on the school social life of the children and should not significantly affect the authenticity of this study.

Pupils in "group S" all live in similar small rural agricultural communities where the school and the church are community centered. Religious views are practically identical with very few exceptions, the Latter-day Saint faith predominates. With the exception of a few grocery stores, service stations, beer halls, a fish hatchery, and a feed mill providing some labor in the towns, most other residents pursue agriculture for a livelihood. Since World War II many farmers have turned to government

work at the army installations located in nearby cities and are either leasing their farms or attempting to operate them in conjunction with their government jobs. There are no cultural centers in the towns, but excellent roads, and modern automotive transportation put the surrounding cities within reach in a matter of minutes.

With one exception, the "group S" schools are not modern buildings. The S-1 school was remodeled in 1936 and does have a functional activity room and lunch kitchen. However, the traditional, two-story framework was not changed, merely renovated. The playgrounds of the rural schools are somewhat superior to the two city schools because it was a tradition in early town life to have a public "square" for games and celebrations, and the school houses were usually erected on the site of the "square." In recent years the grounds have been seeded to grass and stocked with ample playground equipment. The square feet of outside playground area available per child is much greater at the schools in the "S" group. Expendable educational supplies and mobile facilities are fairly well standardized throughout the school system. The P.T.A. organizations on a fund matching plan with the board of education have favored the larger schools on library books and audio-visual equipment, but the board of education is presently in the process of correcting this unequal discrepancy.

The pupils in general come from families of moderate financial means and would not be exposed to the same degree of social stratification that exists among pupils of "group L." Inasmuch as all students included in the problem attended the public schools, the range in financial standing of the families is not sufficient to influence any reasonable difference in educational opportunity.

The curriculum offered in the small schools compares favorably to that in the large schools. The supervision by the County Board of Education standardizes curriculum in all schools to secure uniform instruction throughout the school system. The larger schools can afford a richer extracurricular activity program in respect to lyceums and dramas. These programs are usually financed out of the individual school activity fee, and each school exercises a freedom of choice in how, and for what, it spends its own money. Lyceum companies consider the smaller school inadequate in paying attendance to be worth a financial venture.

10. "The California Achievement Test" is a standardized achievement test for objectively measuring pupil achievements in the fundamental reading, arithmetic, and language skills. Each item has been selected for its diagnostic value in 89 essential elements. Scores on this test will reveal grade placement and percentile ranks of pupils in relation to the general school population. Standardization has been based on more than 50,000 cases at each level. Basic information for the age-grade norms has come from approximately one-half million pupils in many of the school districts in 20 states.

11. "The Otis Beta Quick Scoring Mental Ability Test" is a test devised to measure the mental ability -- thinking power or the degree of maturity of the mind. It is not possible to measure mental ability directly, only the effect mental ability has had in enabling the pupil to acquire certain knowledge and mental skill. Answering some questions depends less upon schooling and more upon mental ability than answering others. This test was constructed with the aim of choosing that type of question which depends as little as possible on schooling and as much as possible on thinking. However, some questions for variety purposes do

appear in the test which might seem at first glance to be measures of achievement. Consequently, if a pupil has grown up with limited educational opportunities, especially with reference to language, his mental ability is not fairly measured by any test involving language. But in a given environment where all children have approximately the same educational opportunities, it is reasonable to assume that a pupil who progresses rapidly in school has greater mental ability for his age than one who progresses less rapidly.

12. "Grade equivalent" (G.E.) is a grade level placement of a particular student in relation to the established norm.

13. "Intelligence Quotient" (I.Q.) is a numerical ratio of individual mental ability found by dividing the pupil's mental age by his chronological age -- mental age being determined by the individual's success on the intelligence test in relation to his chronoligical age. Intelligence Quotients cluster most thickly around 100, but in a few instances go above 150 and below 50.

PROCEDURE

To lend objectivity, this study will concern itself with an analytical comparison of the academic achievement, the achievement test scores made by two groups of Box Elder County sixth-grade pupils during the spring of the 1954-55 school year on the California Achievement Test Battery and the Otis Beta Test for Mental Ability.

Because of the confidential nature of the test material and the identity of the schools participating in the study, the pupil groups shall be referred to as "group L" representing students chosen from the large school, and "group S" representing students chosen from the small schools, as was described in the section on delimitation of terms.

Before logical comparison can be made, the participants in the comparison should be of equal experience and ability. Therefore, a thorough search was made for a fair method to compare the academic achievement of pupils. Other writers have mentioned grades, extracurricular activities, teacher recommendations and opinions, pupil opinions, family background, and social background. These methods appear to be so subjective in scope that emotional prejudices would alter the results. The most logical approach would be to select students of equal intelligence quotients for academic comparison in the two groups. The intelligence test is one of the fairest measures of indicating pupil ability available in the field of tests and measurements today. By selecting pupils of equal intelligence to represent both groups "L" and "S", a fair degree of validity should exist in the results. Therefore, it was decided to equate the I.Q.'s of the pupils selected from both groups to insure an equal ability

to do school work and then match their academic achievement to see if a difference in educational efficiency did exist.

A thorough perusal of recapitulation sheets by schools on file in the Box Elder County Board of Education office containing student grade equivalent by subject (arithmetic, reading, language, and total grade equivalent for all subjects), and a procurement of Otis Intelligence Test quotients from individual cumulative records at the selected schools revealed adequate data to execute the comparison. These school records were found to be complete.

Intelligence quotients and grade equivalents by subject were taken from the above mentioned records for all of the pupils in all of the schools selected in "group L" and "group S." This gave a total of 167 pupils now listed in "group L" and 49 pupils listed in "group S." It was decided to list the I.Q.'s on the 49 students from "group S" by intervals on a frequency range as they fell from high to low. The intervals (from left to right) were as follows:

128, 125, 119, 117, 115, 113, 108, 107, 106, 105,
104, 102, 101, 100, 99, 98, 97, 95, 93, 90,
89, 87, 86, 85, 83, 82, 81, 80, 75.

By reviewing the I.Q.'s of the list of 167 pupils from "group L", 79 pupils were selected with I.Q.'s falling on the same I.Q. intervals as those for "group S." In several incidents, "group L" had from two to five pupils falling on the same I.Q. interval accounting for the difference now of 49 pupils in "group S", and 79 pupils in "group L." "Group S" had only five incidents of a similar situation occurring, and then in four cases, only two pupils fell on the same interval, and in one case three fell on the same interval. It was evident that to compare 49 pupils against 79 would favor the larger group as in some cases there would be

five pupils against one for that particular interval. Because of differences in every pupil's achievement grade equivalent, five pupils with similar I.Q.'s matched against the one pupil would always effect a greater achievement rating in favor of the larger amount of pupils over the smaller amount of pupils per I.Q. interval. In view of this balance of favor, the achievement grade equivalents for each interval of I.Q. for each school participating in the study was averaged. In some cases this was not necessary as only one pupil would be listed for a particular I.Q. interval. This practice was followed only where two or more students maintained the same intelligence quotient.

At the conclusion of the above described procedure of selection, there then were 44 pupils in "group L" and 44 pupils in "group S" with equated intelligence quotients. This would seem to be the fairest possible way to compare objectively pupils for academic achievement, and significantly note any differences that may arise from that comparison.

RELIABILITY OF DATA

No pupil was used in either "group L" or "group S" without proper equating of the I.Q. to insure that equality resided with both groups in ability to do school work.

The Otis Beta Quick Scoring Mental Ability Test was used for determining pupil I.Q.'s, and the California Achievement Test for measuring academic achievement. The testing was conducted by the writer and principals of the other five schools included in the study under the guidance of the school district curriculum supervisors. The writer feels that the testing and correcting was done accurately and according to standard procedure.

The reliability coefficients for grades four through nine of the Beta I.Q. Test was determined by computing split-halves of each test and applying the Spearman-Brown formula to obtain the corresponding coefficient for two full-length tests given under the same circumstances, as follows: grade five -- .89, grade six -- .84, grade seven -- .94, grade eight -- .93, grade nine -- .95.

The reliability coefficients for reading, arithmetic, and language for each form of the California Achievement Tests, Elementary Battery, and for the total test (complete battery) are reported below. They have been determined by averaging the inter-correlations of the different forms of the subject tests and for the Complete Battery for a single grade range (grade five). These coefficients by subject are as follows: reading vocabulary, .88; reading comprehension, .93; total reading, .93; arithmetic fundamentals, .96; total arithmetic, .95; mechanics of English, and

grammar, .90; spelling, .89; total language, .95; total test (complete battery), .97.

All data included in the comparison were not of a subjective nature such as grade marks and teacher and pupil opinions, but were objective findings taken from test results.

PRESENTATION AND ANALYSIS OF DATA

Contained in the preceding section is a complete description of the methods employed in the selection of data and methods of selecting pupils from the various schools to be incorporated into this study. In review, these methods were: (1) selection of intelligence quotients for all pupils from the schools comprising groups "L" and "S", (2) selection of grade equivalents by subject for all pupils from the schools comprising groups "L" and "S", (3) equating the I.Q.'s of all pupils participating in the comparison of both groups to insure equally matched academic ability. In this section, the comparative results arising from these procedures will be analyzed.

The primary and only purpose of collecting individual intelligence quotients was to insure, insofar as possible, matched academic abilities for both groups of pupils participating in the comparison. At this time it would be proper to make a distinction between academic ability and academic achievement. Academic ability could be defined as that academic attainment expected of a particular pupil measured by his performance on a standard intelligence test. Whereas, academic achievement could be defined as the academic level a particular pupil attains when measured by a standard achievement test.

An example of this is illustrated in Table 1, which is an adjustment of grade equivalent achievement norms in relation to intelligence quotient medians in reading taken from the California Achievement Tests -- Elementary Manual -- grades four, five and six. A pupil entering the sixth grade with an I.Q. of 100 is expected to attain a grade equivalent

of 6.0, indicating an expected grade level for an average beginning sixth grader. In Table 1, the norm (6.0) is indicated by .00. A pupil with an I.Q. of 105 would be expected to rate on his grade equivalent .52 above the norm of 6.0, or 6.52. The minus and plus sign and their respective values indicate in hundredths how far above and below the norm of 6.0 that the pupils with the various I.Q.'s are expected to attain in terms of academic achievement.

Table 1. Adjustment of norms in relation to intelligence quotient medians

I.Q.	Reading Vocabulary	Reading Comprehension	Total Reading	Percentile Rank
115	+1.28	+1.30	+1.30	99
111	+1.11	+1.13	+1.13	95
108	+ .77	+ .82	+ .81	90
105	+ .50	+ .56	+ .54	80
103	+ .32	+ .36	+ .34	70
101	+ .19	+ .21	+ .20	60
100	.00	.00	.00	50
98	- .12	- .13	- .13	40
96	- .24	- .27	- .26	30
93	- .45	- .49	- .47	20
89	- .71	- .81	- .77	10
85	- .95	-1.07	-1.02	5
80	-1.16	-1.27	-1.22	1

Individual pupils will vary in their academic achievement according to I.Q. expectancy; however, in the selection of a large number of cases, the averages of the groups will have a tendency to follow these predicted norms.

The scores in terms of grade placement equivalents by subject resulting from the California Achievement Tests, given in March, 1955, for the selected sixth grade students of this study, were collected and tabulated. Grade equivalent averages by school and by subject for the 125 pupils selected for the study were calculated and placed categorically

with their respective schools.

Table 2 shows comparatively by subject schools L-1 and L-2 and their average grade equivalents. It is evident that their achievement scores are so close that equal educational opportunity would prevail at either school. The slight .08 G.E. in favor of the L-1 school would be of no significant meaning. These are scores of grade equivalents before they were averaged per interval of I.Q. On the average G.E. per interval basis, school L-2 reverses the trend in its favor by .066 of one grade equivalent which further proves no significance.

Table 2. Grade equivalents by subjects and totals of the achievement test battery for schools L-1 and L-2

	Grade 6 (Expected Norm 6.6)				
Schools	Reading	Arithmetic	Language	Total for Battery	Average I.Q.
L-1	6.49	6.54	6.49	6.49	102.34
L-2	6.37	6.56	6.43	6.41	103.37

Table 3 lists average grade equivalents for schools S-1, S-2, S-3, and S-4 comparatively by subject. There is evidence of a considerable difference in academic achievement existing among the four smaller schools of "group S." In schools S-2 and S-3, there is a difference of .31 and .55 of one grade level of achievement over the highest school L-1 in Table 2. In view of the equation of I.Q.'s for the comparison this would reasonably indicate a favorable trend toward better educational opportunity existing in these two particular smaller schools. School S-4, with an average G.E. of 6.38, is so close to the average G.E. maintained

by the two larger schools that their programs would appear to be of an equal nature. School S-1 falls one full grade level in achievement behind the averages of schools L-1 and L-2, and one and one-half grade levels behind the highest small school in "group S." It would be reasonably safe to conclude that there is some variance in educational opportunity existing among the smaller schools.

Table 3. Grade equivalents by subject and totals of the achievement test battery for schools S-1, S-2, S-3, and S-4

	Grade 6 (Expected Norm 6.6)				
Schools	Reading	Arithmetic	Language	Total for Battery	Average I.Q.
S-1	5.30	5.64	5.45	5.46	95.05
S-2	6.43	7.02	6.85	6.80	103.60
S-3	6.59	7.15	7.15	7.04	101.36
S-4	6.31	6.40	6.25	6.38	96.5

The foregoing data in this analysis section has been an interpretation of comparative achievement using sixth grade pupils from the larger schools with similar I.Q.'s to all sixth grade pupils from the smaller school. However, for accurate comparison of the two groups "L" and "S", it is now necessary to take an average of total grade equivalents for the battery test per each interval of I.Q. As described in the Procedure section (page 24), in the larger schools there are some cases where as high as five pupils will have the same I.Q. as against one pupil for the smaller schools. An average total grade equivalent for these five pupils would then make one case of grade equivalent for that particular interval of I.Q. The majority of intervals will represent a single pupil, and

several intervals will represent a number of pupils' total grade equivalent averages. After thoroughly equating the intervals of I.Q., there were 44 pupils left in "group L" and 44 pupils in "group S."

Table 4 shows an average grade equivalent total for the achievement test battery per interval of equated I.Q. A difference of .097 in grade level achievement was noted between the two groups of pupils in favor of "group L." This difference was tested statistically with a method listed by Garrett (9, pp. 197-201), wherein a "null hypothesis" assumed the difference to be non-significant because of accident in sampling fluctuations until it could be properly challenged and proven otherwise by the obtaining of a favorable "critical ratio" (C.R.) number approaching 1.96 at the .05 level of significance. These data were properly subjected to the critical ratio formula and a C.R. number of .383 was obtained, proving it to be well out of range of the significant C.R. number 1.96 at the .05 level of significance. It can be safely concluded that the difference of academic achievement (.097) between these two groups of pupils in the "L" and "S" groups is not attributable to any significant difference in educational opportunity among the schools used in this study.

Table 4. Average grade equivalent totals for the achievement test battery per interval of equated I.Q. for both groups "L" and "S"

	Group L			Group S				
I.Q.	24	20	44 *	18	8	9	9	44 *
intervals	L-1	L-2	Total	S-1	S-4	S-2	S-3	Total
128	7.80	7.20	15.00				8.90	8.90
125	8.37	7.20	15.57				8.80	8.80
119	8.50	9.00	17.50			7.40		7.40
117	7.60	7.20	14.80				8.00	8.00
115	6.90	6.70	13.60			7.55		7.55
113	6.90	6.90	13.80	6.55		7.90		14.45
108	6.80	8.00	14.80	6.30	7.20	7.40		20.90
107		6.45	6.45	7.40			7.75	15.15
106		7.20	7.20				6.80	6.80
105	6.46	6.50	12.96		6.90			6.90
104	6.53	6.10	12.63	6.00	6.40			12.40
102	6.87	6.60	13.47	6.20				6.20
101	5.90	6.05	11.95	5.40				5.40
100	6.47	6.50	12.97	5.90		6.10		12.00
99	7.10		7.10	5.80				5.80
98	6.20	5.70	11.90		6.70	6.60		13.30
97	5.70	6.05	11.75	5.70	6.40			12.10
95	6.20		6.20	5.80	6.40			12.20
93	6.45		6.45	5.30		6.10	6.10	17.50
90	5.10		5.10			6.00		6.00
89				4.50				4.50
87				4.70	6.50			11.20
86		5.30	5.30	4.30				4.30
85	5.40		5.40	4.30		5.40	5.50	15.20
83	5.60		5.60	5.50			6.20	11.70
82	5.00		5.00	5.20				5.20
81	5.00	4.60	9.60				5.40	5.40
80		3.80	3.80					
79	3.70	4.10	7.80	4.10	4.50			8.60
75	4.40		4.40					
Total 2950	150.95	127.15	278.10	98.95	51.00	60.45	63.45	273.85
G. E. avg.	6.291	6.357	6.320	5.497	6.375	6.716	7.05	6.223
		-6.223						
I.Q. average	98.33	.097	G. E. difference					

* The numbers on this line indicate the number of pupils taken from each listed school for this comparative study.

SUMMARY

This study was initiated for the purpose of ascertaining the probable differences existing in educational opportunity at four small elementary schools compared with two large elementary schools. It was prompted by the controversy that has existed for decades concerning the differences of pupil achievement in large city and small rural elementary schools. There still is a difference of opinion concerning the educational opportunity available at the small and large elementary school.

The study uses the sixth grade classes of the 1954-1955 school year from the six schools chosen for the problem, and compares the academic achievement of pupils from the four small elementary schools with that of the two large elementary schools.

The six schools in the study are all located in the Box Elder County School District. Two groups were made for comparison. The large 17-teacher and 14-teac her schools were given identification symbols of L-1 and L-2, and were included in one group identified as "group L" -- the letter "L" indicating the large-school group. The small five-teacher, four-teacher, three-teacher, and two-teacher schools were given identification symbols of S-1, S-2, S-3, and S-4, and were included in the second group identified as "group S" -- the letter "S" indicating the small-school group.

Intelligence quotients and academic achievement grade equivalents were obtained from cumulative student records and board of education files for all sixth grade pupils in "group S." Similar data were then collected from the same source for only those sixth grade pupils in "group L" having similar I.Q. intervals in the frequency range as those

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Intelligence quotients and academic achievement grade equivalents were obtained from cumulative student records and board of education files for all sixth grade pupils in "group S." Similar data were then collected from the same source for only those sixth grade pupils in "group L" having similar I.Q. intervals in the frequency range as those

pupils from "group S." The grade equivalents per interval of I.Q. were then averaged and 44 pupils for each group were selected for final comparison.

Upon comparing the "means" of "group L" and "group S", a slight difference of .097 of one grade equivalent was noted in favor of "group L." After putting the difference through a "critical ratio" formula testing for significance, it was found not to be significant, indicating the educational opportunity of the two groups to be of the same quality.

The two larger schools ("group L") indicate a high degree of uniformity existing in their educational offerings. Because of such a slight difference of .066 of one grade equivalent, it is statistically reasonable that the educational opportunity of these two schools should be considered of equal quality for this particular class.

Upon examining "group S" singularly for differences existing among the smaller schools, it is found that schools S-2 and S-3 somewhat exceed the G.E. means accomplished by both schools (L-1 and L-2) of the large "group L." School S-4 accomplished about the same as "group L." School S-1 fell a full one and one-half grade equivalent behind the accomplishment of school S-3, and .83 of one grade equivalent behind the two larger schools in "group L." This interpretation would indicate a possible variance in educational opportunity existing among the smaller schools in the Box Elder County School District.

The supporting studies in the literature to this achievement comparison reveal no universal factor that can be used to determine a consistent judgment that would indicate that either the large or small elementary school is better than the other. The trend of the findings consistently

varied from one side to the other, indicating factors beyond the isolated control of present scientific procedures.

It can be said with reasonable reliability that a trend of thinking evolving from the literature would indicate that no set organizational formulized panacea could be applied with equal effectiveness to two or more different school situations. It would be better to survey the need, appraise the environment, facilitate the decision with adequate tools, then proceed to adapt the school environment to the type of condition the locale desires and thinks best for the development of its philosophical, utilitarian, and educational needs.

CONCLUSIONS

The preceding research has tended to nullify the hypothesis set up at the beginning of this study that pupils from the large, centralized elementary schools will achieve higher academically than will pupils from small three and four-teacher elementary schools. In general, the results of the study indicate a fairly even degree of educational opportunity existing in the large and small elementary schools in the Box Elder County School District. Although there was a slight .097 grade level difference in academic achievement between the large and small experimental groups in favor of the pupils from the larger schools, it was statistically shown to be of no significance. The slight difference could be reliably attributed to accident chance in sampling error.

The two larger schools (L-1 and L-2) indicate a high degree of uniformity existing in their educational opportunity. Because of such a slight difference of .066 of one grade equivalent, it is statistically reasonable that the educational opportunity at these two schools would be considered equal as it is not likely that two groups so close would ever come out with exactly the same result; the result could be reversed alternately due to sampling differences.

Table 4 indicates a 1.553 grade equivalent difference between schools S-1 and S-3 of the small "group S." The educational opportunity for this particular class in school S-1 did not show the same consistency of quality as that of the same grade of classes in the other schools. It would be reasonable to conclude that there might be some variance in educational opportunity existing among the smaller schools in the Box Elder County

School District.

The findings of this study disagree in part with the published results of May (16, pp. 36-38), Henry (12, pp. 38-41), Clem and Hovey (5, pp. 269-272), and others listed in the Review of Literature. These studies show the small elementary school child when compared with the large consolidated elementary school child to be inferior in all areas of academic accomplishment. This study shows them to be fairly equal.

If Henry had equated the I.Q.'s, the results may have favored the rural children. He found the rural children made poorer scores on the achievement tests than the city children, but grade marks were about equal for both groups. The rural children had a 10.3 lower I.Q. mean than the city children, which could possibly mean that the rural children achieved more according to their abilities. This would show a comparative credit toward the existing educational opportunities at the rural school and not the negative reflection that Henry attempted to cast.

A great deal more research conducted on a much wider basis would have to be initiated before any permanent scientific conclusion could be reached. It would appear that a good school can be made out of any size school providing the quality of the instruction, material to instruct with, and the spirit to do so is available. It is the belief of the author that where future comparative studies are conducted, and the abilities to do school work according to intelligence performance by the pupils chosen are equal, only a similarly close comparative difference would exist. Class personalities, individual competitive desires, emotional differences, intra-class social relations could all concomitantly react to accelerate, or retard, an achievement ratio

with a particular group of pupils beyond the influential effect, or control, of the educational opportunity existing at the particular school studied.

Wofford (26, p. 241) states from the Biennial Survey of Education:

> The so-called 'subjects represent adult attempts to organize the environment so as to give added meaning to significant aspects of our general experiences. Modern education is not concerned with this subject matter as such, but with the child's total experience, his total learnings, his present and potential behavior. All learning is the outcome of things done, and is integrated and unified around wholesome living. It is through participation in living that attitudes and habits are formed, skills are acquired, valuable information is obtained, and character is built. The only required school or compulsory curriculum is then, after all, practice in daily living. This problem is as old as man; time and environment may change, human inventions come and go, but to learn to live one's daily life well is still of prime importance as the basic purpose of the educative process.'

If a small or large school best fits the total environment of a particular people and aids their culture in promoting the living of a daily life well, then the basic purpose of the educative process has been fulfilled.

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APPENDIX

APPENDIX

This section contains tables of raw data for each school included in the study, collected from pupil accumulative records and the Board of Education files before the proper selection of pupils for statistical refinement and comparative analysis took place.

Table 5. Grade equivalent scores by subject, total battery scores (complete test) and I.Q.'s of sixth grade pupils from school S-1

Student Number	Reading	Arithmetic	Language	Total for Battery	I.Q.
1	7.1	7.5	7.5	7.4	107
2	6.8	7.4	6.7	7.1	113
3	5.3	7.2	6.2	6.2	108
4	5.7	6.4	6.1	6.2	102
5	5.5	6.2	6.1	6.0	104
6	6.1	5.8	6.2	6.0	113
7	5.7	6.1	5.3	5.9	100
8	5.3	5.9	6.2	5.8	95
9	5.5	6.3	5.4	5.8	99
10	5.3	6.0	5.7	5.7	97
11	5.8	5.0	6.0	5.5	83
12	5.6	5.2	5.6	5.4	101
13	5.8	4.6	5.7	5.3	93
14	4.5	5.8	4.8	5.2	82
15	4.0	5.1	5.0	4.7	87
16	4.4	4.4	4.8	4.5	89
17	4.7	4.1	4.4	4.3	86
18	4.6	4.9	4.5	4.3	84
19	3.9	4.5	3.7	4.1	77
20	3.5	4.1	3.1	3.7	81
Average G.E. and I.Q.	5.30	5.64	5.45	5.46	95.05

Expected G.E. --- 6.27

Table 6. Grade equivalent scores by subject, total battery scores (complete test), and I.Q.'s of sixth grade pupils from school S-2

Student Number	Reading	Arithmetic	Language	Total for Battery	I.Q.
1	7.8	7.6	8.8	7.9	113
2	7.5	7.6	7.4	7.6	115
3	7.5	7.9	7.0	7.5	115
4	6.9	7.3	7.9	7.4	119
5	7.5	7.2	7.7	7.4	108
6	6.3	6.7	6.8	6.6	98
7	6.0	6.3	5.8	6.1	100
8	5.3	6.6	6.2	5.1	93
9	5.1	7.0	5.4	6.0	90
10	4.4	6.0	5.5	5.4	85
Average G.E. and I.Q.	6.43	7.02	6.85	6.8	103.6

Expected G.E. --- 6.83

Table 7. Grade equivalent scores by subject, total battery scores (complete test), and I.Q.'s of sixth grade pupils from school S-3

Student Number	Reading	Arithmetic	Language	Total for Battery	I.Q.
1	8.5	8.9	9.5	8.9	128
2	8.1	8.8	9.5	8.8	125
3	7.8	8.1	7.9	8.0	107
4	7.9	8.2	7.7	8.0	117
5	6.9	7.5	7.7	7.5	107
6	6.4	7.1	6.3	6.8	106
7	5.7	6.4	6.8	6.3	83
8	6.1	5.9	6.6	6.1	83
9	5.9	5.8	7.1	6.1	93
10	4.6	6.1	5.4	5.5	85
11	4.6	5.8	5.6	5.4	81
Average G.E. and I.Q.	6.59	7.15	7.15	7.04	101.36

Expected G.E. --- 6.69

Table 8. Grade equivalent scores by subject, total battery scores (complete test), and I.Q.'s of sixth grade pupils from school S-4

Student Number	Reading	Arithmetic	Language	Total for Battery	I.Q.
1	6.8	6.9	7.2	7.0	108
2	7.0	7.0	6.9	6.9	105
3	6.7	6.8	6.7	6.7	98
4	6.4	6.5	6.7	6.5	87
5	6.4	6.0	6.6	6.4	104
6	6.8	6.2	6.4	6.4	95
7	5.5	7.0	6.0	6.4	97
8	4.9	4.7	3.5	4.5	78
Average C.E. and I.Q.	6.31	6.4	6.25	6.38	96.5

Expected G.E. --- 6.33

Table 9. Grade equivalent scores, by subject, total battery scores (complete test) and I.Q.'s of sixth grade pupils from school L-1

Student number	Reading	Arithmetic	Language	Total for battery	I.Q.
1	8.3	7.2	9.0	7.8	128
2	8.8	8.2	8.8	8.5	125
3	8.3	7.6	8.2	8.0	125
4	8.8	8.5	8.6	8.6	125
5	9.0	8.6	7.7	8.5	119
6	9.0	7.1	7.2	7.6	117
7	8.3	6.7	7.2	7.1	115
8	6.6	7.1	6.5	6.8	115
9	6.5	7.3	6.5	6.8	115
10	6.8	6.6	7.4	6.9	113
11	7.0	6.5	7.2	6.8	108
12	6.7	6.9	7.0	6.8	108
13	6.5	6.5	6.9	6.7	108
14	7.5	6.8	7.2	7.0	108
15	5.8	6.4	5.5	6.0	105
16	6.8	6.5	6.4	6.6	105
17	6.6	6.7	6.9	6.8	105
18	6.8	7.2	6.6	6.8	104
19	6.1	6.2	6.6	6.3	104
20	6.7	6.7	5.6	6.5	104
21	6.3	7.2	5.6	6.6	102
22	6.6	6.7	7.4	6.8	102
23	6.5	7.3	7.0	7.2	102
24	5.9	5.7	5.9	5.8	101
25	5.4	5.8	5.7	5.7	101
26	6.8	5.9	6.8	6.3	101
27	6.9	6.6	6.7	6.7	100
28	5.8	7.0	5.5	6.3	100
29	6.5	6.0	4.9	5.9	100
30	6.7	6.9	7.7	7.0	100
31	6.6	7.3	7.2	7.1	99
32	6.9	5.9	6.2	6.4	98
33	5.6	6.4	5.8	6.0	98
34	5.9	5.0	6.8	5.7	97
35	5.3	6.5	6.7	6.2	95
36	6.6	7.2	6.4	6.9	98
37	5.6	6.0	6.9	6.0	93
38	4.7	5.7	4.5	5.1	90
39	5.5	5.2	5.7	5.4	85
40	5.4	5.8	5.4	5.6	83
41	4.1	6.1	4.5	5.0	82
42	5.1	5.8	4.9	5.0	81
43	3.2	4.1	3.8	3.7	79
44	4.8	4.3	4.5	4.4	75
Average G.E. and I.Q.	6.49	6.54	6.49	6.49	102.34

Expected G.E. - - - 6.75

Table 10. Grade equivalent scores by subject, total battery scores (complete test), and I.Q.'s of sixth grade pupils from school I-2

Student number	Reading	Arithmetic	Language	Total for battery	I.Q.
1	9.0	9.0	9.0	9.0	119
2	7.9	6.9	7.3	7.2	128
3	7.9	7.3	6.6	7.2	125
4	7.9	6.9	6.8	7.2	117
5	7.6	6.6	6.3	6.7	115
6	6.8	7.3	8.3	7.4	113
7	6.5	6.1	6.9	6.4	113
8	7.6	8.3	7.5	8.0	108
9	6.7	6.8	5.7	6.5	107
10	6.1	6.9	5.7	6.4	107
11	6.4	6.5	7.1	6.6	106
12	6.9	8.2	7.7	7.8	106
13	6.1	6.0	6.5	6.2	105
14	7.3	7.7	5.8	6.8	105
15	5.9	5.8	7.0	6.1	104
16	5.6	6.1	6.8	6.1	104
17	6.0	6.9	5.8	6.4	102
18	4.5	6.2	5.7	5.6	102
19	7.2	6.8	7.1	6.9	102
20	9.0	7.2	7.3	7.5	102
21	5.9	6.2	6.1	6.1	101
22	5.4	5.7	7.3	6.0	101
23	5.4	6.9	7.3	6.5	100
24	6.4	6.2	6.7	6.4	100
25	7.2	7.5	5.0	6.6	100
26	5.2	6.1	5.3	5.7	98
27	5.5	6.7	6.8	6.4	97
28	5.5	5.7	5.9	5.7	97
29	4.5	5.9	5.4	5.3	86
30	3.1	4.0	4.3	3.8	79
31	4.2	4.9	4.7	4.6	81
32	3.6	4.5	4.2	4.1	78
Average G.E. and I.Q.	6.27	6.56	6.43	6.41	103.37

Expected G.E. - - - 6.82