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A survey of the opinion of interested persons about the high-school diploma

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Boston University

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Boston University
A survey of the opinion of interested persons about the high-school diploma.
BOSTON UNIVERSITY
SCHOOL OF EDUCATION

MASTER'S PAPER

A SURVEY OF THE OPINION OF INTERESTED PERSONS
ABOUT THE HIGH-SCHOOL DIPLOMA

Submitted by

George Arthur Wilson
(B.S., Massachusetts Institute of Technology, 1920)

In partial fulfillment of requirements for
the degree of Master of Education

1946

First Reader: Roy O. Billett, Professor of Education
Second Reader: J. Wendell Yeo, Associate Professor of Education
Third Reader:
Gift of Gini Wilson
School of Education
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what means to be "well" in medicine
and what is good and how many
is the true one in its own nature.

An explanation of the use of
what is good and why it
does not prolong life.

Further studies necessary to confirm.

What helps older individuals to recover.

What makes older people healthy.

What are the advantages of a healthy life?
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CHAPTER I

THE PROBLEM AND METHOD OF PROCEDURE

The problem

Statement of problem.-- It is the purpose of this study to investigate (1) whether or not the present high-school diploma should be changed to keep pace with the changes in secondary education and (2) to secure the opinion of interested persons about possible desirable changes in the diploma.

Importance of study.-- For many years, the public school housed a population whose principal aim was admission to college. Elimination of those who could not "make the grade" was accepted as a matter of course, but, in recent years, the high school population has grown at an unprecedented rate. Numerous factors, according to Koos, have contributed to this influx of older pupils, chief among them may be listed (1) decrease in employment of youth due to child labor laws and labor union restrictions, (2) increased vocational school opportunities, (3) increase in urban population, and (4) development of better guidance organizations in the schools. Accompanying this trend, there originated the slogan, "Get a High School

Diploma”. Soon employers adopted the plea and used it as a criterion for selection of personnel.

Employers were not fully aware of the growth of the school or the change in complexity of the high school population and they assailed the school boards and the teachers for their inferior products. They were quoted as saying, "The high-school diploma doesn't mean a thing," whenever they acquired a graduate of limited ability and low achievement. As a result, employers lost faith in the diploma and they sought personal recommendations and records from the schools. Of course, placement bureaus proved advantageous in larger school systems by selecting pupils best suited for each position.

In spite of the demands of the public for better vocational education, the college preparation idea still prevailed as a chief purpose of the school. It was becoming apparent that the high school was subjected to two pressures; the dominance of the college and the demands of the local employer.

Finally in 1944 and 1945, two authoritative publications\(^2\) restated the aims and purposes of secondary education. The collegiate "master" had, heretofore, given no formal

\(^2\) Educational Policies Commission, Education for All American Youth (Washington: National Education Association, 1944) -- Committee on the Objectives of General Education in a Free Society. Harvard University, General Education in a Free Society (Harvard University Press, 1945)
recognition of the real problem of public high-school education; namely, to provide "general education" for seventy-five per cent of the pupils. For Harvard and the Educational Policies Commission to admit that non-college-aspiring youth required the serious consideration of educators was well received by many public-school men who have struggled unassisted for years to develop curriculums suited to the needs of all the pupils.

This change of emphasis is practically a challenge to the public school to retain and graduate every youth, regardless of interest, ability or social background. To fulfill this program standards must be lowered to meet the level of some groups. If this is done, a diploma from high school will represent a wide range accomplishment, but in its present form it actually implies uniform achievement.

**Brief outline of the procedure.**—The following steps were taken in this investigation, (1) a review of the literature, (2) a study of the history and development of the diploma, (3) a survey of interested persons and (4) an analysis of the opinions expressed by them.

**Review of literature.**—A careful perusal of the "Education Index", the "Readers' Guide", the "Bibliography of Research Studies in Education" (1935-1940) and the
Boston University Library catalogue has revealed a dearth of material relating to diplomas. Most of the articles are referred to in the remaining portion of this chapter. The bibliography contains fifteen references, six of which are recent periodicals and the remainder are books, reports and one master's paper.

The history and development of the diploma.-- John Haney\(^3\) states that the Central High School in Philadelphia gave out twenty-five "Certificates of Graduation" in 1842. This practice continued until July 1847 when the name was changed to "Testimonials of Graduation" and, later, in 1850, the high school awarded the degree of Bachelor of Arts for a four year course. "In 1853, some graduates received a Master of Arts degree, some Bachelor of Arts and some certificates for partial courses".

Emit D. Grizzell\(^4\) writes in his book on New England high schools before 1865, this statement, "no high school awarded diplomas or held formal graduation exercises before 1850". Diplomas awarded at Concord, N. H. in 1860 contain precisely the same phraseology as those awarded today. Of course, in these early days only preparation for college or teaching were considered the aims of education.

\(^3\) John Haney, "First High School Diplomas". The School Review (September 1930) 38:544-547

a prejudice was encountered. Backgrounds varied widely, and 
interests were diverse. With regard to educational outcomes, 
there was great concern that the educational system was not providing adequate 
preparation for the future. Many believed that the system was 
"rigid" and placed too much emphasis on traditional 
methods and outdated curricula. 

In the context of this discussion, the focus on 
education as a means to social mobility was prominent. The 
view that education should serve as a pathway to upward 
mobility was prevalent, with many arguing that the system 
was failing to provide equal opportunities for all students. 

There was a strong sentiment that the system needed to be 
reformed to address these issues. The need for 
innovation and change was widely acknowledged. 

Overall, the document highlighted the 
importance of education in shaping opportunities and 
outcomes, and the need for systemic 
reform to ensure equitable access and 
outcomes.
A sample of one of the earliest diplomas granted at Quincy High School is reproduced below:

Picture of the First High School in Quincy

MARY ELIZABETH HARDWICK

has completed the prescribed course of study at the QUINCY HIGH SCHOOL and by her attainments and correct deportment is entitled to this TESTIMONIAL
given at Quincy this fourteenth day of March in the year of our Lord one thousand eight hundred and sixty-five.

(Signed) JOHN O. HALL (Signed) E. W. Howe Chairman of School Committee Principal

Recent developments.-- As soon as varied curriculums were developed, the practice of designating the "course of study" pursued came into general use. For a time, this served a real need because standards were high and the mortality likewise was high, in spite of the fact that specialization was available.

In 1924, the Commonwealth of Massachusetts, Department of Education published the following recommendation without comment, "It is recommended that the same diploma be given to all students who have met the requirements for graduation, regardless of the curriculum pursued".

5/ Bulletin of the Department of Education, Manual for High Schools (Boston: Department of Education, 1924) 151.5 p.28
More recently Los Angeles in 1932, adopted a plan which provided for three types of award, (1) Diploma of Graduation, (2) Certificate of Completion and (3) Letter of Attendance. The last two were a formal way of granting termination papers to those who failed to secure a regular diploma. As might be expected, the majority of the pupils sought and received a diploma of graduation and the plan has been abandoned.

Mr. A. Russell Mack, Supervisor of Secondary Education in Massachusetts stated at a recent meeting of the Massachusetts High School Principals that 150 out of 259 high schools in the state do not differentiate curriculums on the diploma. Nelson J. Ramsdell in a report on New York State, states that "98 per cent of the schools use local diplomas and all diplomas have the same value".

The diploma awarded at Quincy High School is typical of those in universal use in New England since 1856. Originally they were called "Testimonials of Graduation", but on August 5, 1867 the local school committee took the

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following action according to the records\(^8\), "Voted Diplomas to be awarded at the close of each or either course". In 1892, a two-year "Business Course" was introduced and a certificate of completion was given to those who passed satisfactorily, the required subjects. The present high-school diploma carries the name of the "course".

It may be well to mention a few cases where schools have departed from the customary types of diplomas. At Cleveland, Ohio, the school department awards a diploma which provides for a record of achievement on the back of it. Eleven different subject-matter fields are listed and space is provided for marks, number of semesters, "courses", and recommendation for excellence in _ _ _ \(^9\).

According to Theodore Kambour\(^10\), at Montpelier, Vermont, a separate diploma is awarded to those who fail to meet all the requirements for graduation called "Limited Certificate of Graduation." At Swampscott, Massachusetts, a complete transcript of the high-school record is presented on a separate form with the diploma.

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\(^8\) Records of the Quincy School Committee Volume I.

\(^9\) Name of subject.

Comments by others.—Ellis L. Keone\(^{11}\) lists as one of seven fallacies in education, "The goal of school work is a diploma".

W. C. Reavis and Leonard C. Lund\(^{12}\) state "The diploma offers possibilities of service that have been largely neglected in the past......If two pupils, one ranking at the top of his class and the other at the bottom receive the same kind of diploma, there is no recognition made of the difference in the scholastic standing of these two pupils......

An excellent way to obviate such misunderstandings is to make the diploma complete in that it shows the studies pursued and the marks received in each course."

Francis T. Spaulding\(^{13}\) generalizes the purpose of a diploma in these words:

"It should offer an unequivocal judgment as to the extent the school has achieved its fundamental aims in the case of the pupil to whom the diploma is given, irrespective of the details of what the pupil has done."

Two aims are referred to as "preparation for effective citizenship and preparation for college or a vocation".


\(^{13}\) Francis T. Spaulding, "What Should a Diploma Say?" Nations Schools (April 1939)
Obviously a uniform diploma does not indicate the "extent the school has achieved" its aims.

Will French\footnote{Will French, "What Should Graduation From the Secondary School Mean?" Department of Secondary-School Principals, Bulletin #87, National Education Association, Washington, D.C. (December 1940) p. 48.} stresses the employers' need to obtain more specific information "instead of basing decisions on the bare fact of graduation."

Preparation for Survey

Method of procedure of survey.-- In order to determine what changes might prove beneficial to all concerned, a check list was prepared. Pupils, parents, teachers, graduates, and employers were considered to be most vitally interested. It was planned to get a fair sampling of each group. Fifty replies from each group were considered sufficient to get an expression of opinion.

Selection of participants.-- It was planned to get the reactions from a cross section of the student body. Care was taken to secure replies from pupils in each curriculum and from pupils of varying achievement and ability. In selecting parents, a cross section was acquired by asking heterogeneous home-room groups to take the check lists home. The teachers were selected from the secondary schools both in Quincy and the surrounding cities and towns. The employers were selected from those who regularly employ local graduates and represent both
large and small businesses. Some returned veterans were asked to express an opinion also.

Preparation of check list. -- In-as-much as most of the present diplomas are rarely seen because the habit of framing them has been discontinued, it seemed wise to acquaint the prospective respondents with their format before inviting comments. The second factor appeared to be the need to provide a list of proposed changes which might improve the usefulness of the diploma. The third factor was to determine where the proposed additions should be placed; that is, whether on the back of the diploma or on a separate record form. The final section was arranged to determine the type of diploma preferred. The entire check list and covering letter are reproduced in Appendix A.

Summary. -- The high-school diploma has persisted for many years a document testifying completion of a unit of educational development. In the beginning it was a symbol of special academic ability but in recent years it has changed considerably because of the changed school population, the variety of offerings and the tendency to retain all pupils until graduation. A few attempts have been made to develop a diploma to satisfy the changed conditions, but progress has been slow and ineffective. There seems to be general recognition of the need for a more appropriate diploma, but either apathy or lack of confidence in marking systems appears to retard progressive action.
CHAPTER II

SOME PRELIMINARY CONSIDERATIONS

Before proceeding with results of the survey, an investigation of facts about graduates of Quincy High School was made. A comparison of the growth of the city with the growth of the high-school population, a study of the distribution of the average marks of potential graduates and a study of the changing mortality between the tenth and twelfth grades were considered important phases of the diploma problem.

The organization of the Quincy school system.-- Quincy has a comprehensive 6-3-3 organization as of September 1945, when the Quincy Trade School became a department of the high school. Graduates of the Trade Department will receive high-school diplomas with the name of the trade studied, engraved on the diploma. Three junior high schools promote pupils to Quincy High School but no diplomas are awarded at the junior schools. The North Quincy High School which grew into a 6-3-3 unit within the same building was opened in 1931 to take care of the rapid growth in population in the northerly portion of the city.

Increase in population.-- According to the United States census reports, the Quincy population increased as follows:

-11-
The purpose of the present study was to determine the effect of
an experimental procedure on the behavior of subjects in a
social situation. The subjects were 20 male students who were
divided into two groups of 10 each. Group A consisted of
students who were exposed to the experimental procedure, while
Group B served as a control group. The experiment was conducted
in a laboratory setting, with the experimental procedure taking
place in a designated area. Feedback was provided to the
subjects after the experimental procedure, and their
behavior was observed and recorded. The results of the
experiment indicated that the experimental procedure had a
positive effect on the subjects' behavior, as evidenced by an
increase in cooperation and a decrease in aggression.

It is concluded that the experimental procedure
is effective in modifying behavior in a social
situation. Further research is needed to
investigate the long-term effects of the
procedure, as well as to determine the
appropriate use of such techniques in
real-world settings.
<table>
<thead>
<tr>
<th>Date</th>
<th>Population</th>
<th>High School Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1920</td>
<td>47,876</td>
<td>1336</td>
</tr>
<tr>
<td>1930</td>
<td>71,983</td>
<td>2046</td>
</tr>
<tr>
<td>1940</td>
<td>75,810</td>
<td>3437</td>
</tr>
<tr>
<td>1945</td>
<td>80,000</td>
<td>2308</td>
</tr>
</tbody>
</table>

The present (1945) population is estimated at 80,000 persons, according to the local police census. These figures indicate a much more rapid growth between 1920 and 1930 than between 1930 and 1940. During the same time, the high-school enrollment more than doubled.

**Marks obtained by graduates.**—A careful analysis of the Quincy High School office records provided some interesting facts, which are tabulated in Table 2. The figures in column two are somewhat higher than the actual number of graduates because the average of marks was made at the close of the third quarter of the year. The actual difference, however, is less than five per cent because nearly all who reach the last quarter are "granted" diplomas.

In order to determine the numerical position of each pupil in the class a list is compiled annually. The average mark of a pupil is found by adding all marks (except physical education and one point courses) together and dividing by the total number of marks. This is not a true average but it gives a satisfactory basis for determining the position of a pupil in his class.
Table 2. Variation of the Mean of the 12th Grade Average Marks from 1924 to 1945, and the Average Ages

<table>
<thead>
<tr>
<th>Class</th>
<th>Number in 12th Grade in April</th>
<th>Mean of Marks in Per cent</th>
<th>Average Age yrs. mos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>1924</td>
<td>250</td>
<td>74.35</td>
<td>18-2</td>
</tr>
<tr>
<td>25</td>
<td>247</td>
<td>73.68</td>
<td>18-2</td>
</tr>
<tr>
<td>26</td>
<td>257</td>
<td>72.55</td>
<td>17-11</td>
</tr>
<tr>
<td>27</td>
<td>343</td>
<td>75.50</td>
<td>18-0</td>
</tr>
<tr>
<td>28</td>
<td>406</td>
<td>73.51</td>
<td>18-1</td>
</tr>
<tr>
<td>29</td>
<td>356</td>
<td>72.77</td>
<td>17-10</td>
</tr>
<tr>
<td>30</td>
<td>404</td>
<td>75.26</td>
<td>18-0</td>
</tr>
<tr>
<td>31</td>
<td>433</td>
<td>75.79</td>
<td>18-1</td>
</tr>
<tr>
<td>32</td>
<td>548</td>
<td>74.37</td>
<td>18-1</td>
</tr>
<tr>
<td>33</td>
<td>521</td>
<td>73.99</td>
<td>18-0</td>
</tr>
<tr>
<td>34</td>
<td>535</td>
<td>73.02</td>
<td>18-0</td>
</tr>
<tr>
<td>1935</td>
<td>537</td>
<td>73.85</td>
<td>18-0</td>
</tr>
<tr>
<td>36</td>
<td>563</td>
<td>73.51</td>
<td>17-11</td>
</tr>
<tr>
<td>37</td>
<td>586</td>
<td>73.53</td>
<td>17-10</td>
</tr>
<tr>
<td>38</td>
<td>560</td>
<td>73.95</td>
<td>17-11</td>
</tr>
<tr>
<td>39</td>
<td>534</td>
<td>73.35</td>
<td>17-10</td>
</tr>
<tr>
<td>40</td>
<td>590</td>
<td>73.81</td>
<td>17-10</td>
</tr>
<tr>
<td>41</td>
<td>512</td>
<td>74.40</td>
<td>17-10</td>
</tr>
<tr>
<td>42</td>
<td>495</td>
<td>75.50</td>
<td>17-11</td>
</tr>
<tr>
<td>43</td>
<td>429</td>
<td>74.02</td>
<td>17-10</td>
</tr>
<tr>
<td>44</td>
<td>312</td>
<td>74.07</td>
<td>17-10</td>
</tr>
<tr>
<td>1945</td>
<td>353</td>
<td>74.93</td>
<td>17-10</td>
</tr>
<tr>
<td>Average</td>
<td>443.7</td>
<td>74.13</td>
<td>17-11</td>
</tr>
</tbody>
</table>
It is of interest to note that the mean of these marks has a range from 75.79 per cent to 72.55 per cent or a total variation of only 2.24 per cent. The average (74.13 per cent) for the twenty-two year period is probably about normal for a five-point marking system.

**Average age.**—The average age of graduates is what should be expected for pupils who start school in September at the age of six and attend school for twelve years. The table shows clearly the effect of the war on the size of the graduating classes. There is a drop from 580 in 1940 to 353 in 1945. The demands of industry for youth, voluntary enlistments, and the lure of lucrative war jobs were responsible for this shrinkage because the population continued to increase.

**Increase in twelfth-grade enrollment.**—In order to determine the extent to which the enrollment has varied over a period of years, the figures given in Table 3 were obtained from the annual reports of the Quincy school committee. A comparison of column 1 and column 3 in Table 3 reveals a very rapid rise in enrollment up to 1934, than a gradual falling off until 1943. Figure 1 shows the relationship more clearly.

The percentage of tenth grade pupils who remained in school until the twelfth year is shown in Figure 2. It should be noted that before 1932 about 55 per cent of the tenth grade entered the twelfth grade, but from 1933 to
Figure 1. Number of pupils enrolled in the 10th and 12th grades from 1925 to 1943 in Quincy High Schools.
Table 3. Comparison of 10th and 12th Grade Enrollments in Quincy High Schools from 1925 to 1943.

<table>
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<th>3</th>
<th>4</th>
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<tbody>
<tr>
<td></td>
<td>Enrollments *</td>
<td>Per cent Remaining</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10th Grade</td>
<td>12th Grade</td>
<td></td>
</tr>
<tr>
<td>1925</td>
<td>443</td>
<td>251</td>
<td>56.8</td>
</tr>
<tr>
<td>1926</td>
<td>460</td>
<td>267</td>
<td>58.1</td>
</tr>
<tr>
<td>1927</td>
<td>538</td>
<td>345</td>
<td>63.2</td>
</tr>
<tr>
<td>1928</td>
<td>657</td>
<td>391</td>
<td>58.6</td>
</tr>
<tr>
<td>1929</td>
<td>647</td>
<td>356</td>
<td>55.2</td>
</tr>
<tr>
<td>1930</td>
<td>719</td>
<td>379</td>
<td>52.7</td>
</tr>
<tr>
<td>1931</td>
<td>808</td>
<td>438</td>
<td>54.3</td>
</tr>
<tr>
<td>1932</td>
<td>836</td>
<td>545</td>
<td>65.2</td>
</tr>
<tr>
<td>1933</td>
<td>973</td>
<td>729</td>
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* October figures
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<td>0.20</td>
<td>0.20</td>
<td>0.20</td>
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</tbody>
</table>
Figure 2. Curve of percentage of 10th grade pupils who remained in school until the 12th grade from 1925 to 1943.
1943 about 75 per cent remained in school. This increase of twenty per cent has produced a marked change in the population of the twelfth grade. Many pupils who would have sought employment before 1932 are now retained in school until graduation. The sudden drop in 1943 reflects the drain in man-power caused by the war.

**Distribution of the marks of graduates.**— The distribution curves of the average of marks of the graduates of three classes are produced in Figure 3. The calculations of standard deviations for these curves are included in Appendix B. In every case the hump of the curve is located below the mean. The spread of these marks is introduced to show that a large number of pupils are securing diplomas for marks below 75 per cent. The achievement of graduates ranges from about 90 per cent to 60 per cent, yet each receives a diploma which does not indicate the degree of accomplishment. As stated in Chapter I, employers who do not understand this "spread" of marks assume the diploma represents superior achievement. Actually it indicates only attendance for three or more years with reasonably satisfactory conduct and a passing grade of work.

**Summary.**— The foregoing figures and tables give a graphic description of some factors bearing on the diploma problem. They indicate a very rapid growth in school population, particularly in the twelfth grade with
Figure 3. Percentage distribution of the average marks of graduates of the classes of 1922, 1932 and 1945 at Quincy High School.
the resulting increase in the number of graduates. The age level has reduced somewhat thus showing that the increase in enrollment was not due to retention of over-age pupils. The distribution of marks at ten year intervals shows no special variation which indicates no appreciable change in standards of marking. The conclusion must be drawn that the growth is primarily due to external causes. Actually the introduction of "homogeneous" grouping and provision for individual differences has been involved in this tendency to remain in school until graduation but it would be very difficult to measure their effect.
nothing further to add.
CHAPTER III

ANALYSIS AND INTERPRETATION OF REPLIES
OF RESPONDENTS TO CHECK LIST

Number of replies.-- Fifty parents, teachers and pupils made replies. Twenty-eight employers and 24 World War II veterans responded. A brief analysis is provided in the appendix to indicate the occupation of parents, types of pupils and types of businesses represented by the employers. In general, they are a cross section of the persons most vitally interested in the high-school diploma. The parents' occupations range from architectural engineer to janitor; the pupils range from high ability college preparatory to low ability non-college twelfth graders; the teachers range from those of long teaching experience to recent appointees and represent all curriculums; the employers range from large to small businesses; and the veterans include both graduates and non-graduates from high school.

None of the respondents were given any instructions except those shown in the covering letter and the check list. It may be concluded that the replies represent the independent opinions of most of the respondents. This was particularly true of pupils who were asked to check the list without a preliminary discussion of it.
of the conclusions of the experiments.

These conclusions are based on the following
observations: 

1. The results of the experiments indicate that the
method of treatment used was effective in reducing
the symptoms of the disease.

2. The treatment was well tolerated by the patients,
and there were no adverse effects.

3. The results suggest that the treatment may be
beneficial in the long term, as it appears to slow
the progression of the disease.

4. Further research is needed to confirm these
findings and to determine the optimal treatment
dosage and duration.

In conclusion, the results of these experiments
support the use of the treatment method in
the management of the disease.

Future studies should focus on refining the
treatment protocol and assessing its efficacy in
larger patient populations.
Proposed desirable omissions

Replies to Section II of the check list.— The data in Table 4 indicates general approval of the facts contained on the present diploma except items five and eight. The chief objection to item five is the word "honorably". Two respondents suggested using the term "satisfactorily completed" whereas all the others are content to leave out "honorably" and permit the word "completed" to remain without a modifier. Fourteen persons, ten of whom were teachers, object to it. However, eighty per cent of the teachers do not question it.

Item eight (signature of mayor) is considered undesirable by 40 respondents. It is checked with approximately the same frequency by each group. The reason expressed by several is the desire to separate education from politics; however, in Quincy, the mayor is chairman of the school committee and automatically participates in the control of the school department, therefore this reasoning is inconsequential.

One surprising result is the small number of persons who checked item six (name of the course). In a study made by W. C. Reavis and Leonard C. Lund in 1932, only approximately sixteen per cent of the schools investigated used the differentiated type of diploma. Evidently local usage has met with favorable approval. Quincy diplomas

\[\text{op. cit. p. 9}\]
INTERNAL ALLOCATION WORKS

The allocation of resources is a critical aspect of internal works, ensuring that the necessary supports and procedures are in place to facilitate efficient operations. Allocation involves careful planning and consideration of factors such as capacity, demand, and resource availability. Effective allocation requires a systematic approach to identify and prioritize needs, ensuring that resources are allocated in a manner that maximizes efficiency and productivity. This process is vital for maintaining the integrity of internal works, enabling smooth operations and facilitating growth.
have indicated the "course" pursued for more than thirty years with no recorded complaints.

Table 4. Number of proposed desirable omissions checked.

<table>
<thead>
<tr>
<th>Item</th>
<th>Group</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2. Name of city</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>3. Name of state</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>5. Reason for award</td>
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<td>3</td>
<td>1</td>
<td>0</td>
<td>14</td>
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<tr>
<td>6. Name of course</td>
<td></td>
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<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>7. Date of graduation</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
</tr>
<tr>
<td>8. Signature of mayor</td>
<td></td>
<td>8</td>
<td>13</td>
<td>8</td>
<td>5</td>
<td>6</td>
<td>40</td>
</tr>
<tr>
<td>9. Signature of superintendent</td>
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<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

For sake of clearness and uniformity the groups are to be numbered as follows:

Group
Parents  .  .  1
Teachers .  .  2
Pupils   .  .  3
Employers. .  4
Veterans .  .  5
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Start</td>
<td>Ready</td>
</tr>
<tr>
<td>1</td>
<td>Task 1</td>
<td>Busy</td>
</tr>
<tr>
<td>2</td>
<td>Task 2</td>
<td>Ready</td>
</tr>
<tr>
<td>3</td>
<td>Task 3</td>
<td>Busy</td>
</tr>
</tbody>
</table>

Note: The states and events are placeholders for illustrative purposes.
Proposed Desirable Additions

Replies to Section III of the check list.-- The data is shown in Table 5. To conserve space some of the captions have been shortened somewhat by omitting the explanatory notes. It was interesting to note that only seven parents, two teachers and six pupils did not check a single item in the list. It is apparent that they are satisfied with the present diploma. In other words, 10 per cent of these three groups were satisfied. Every employer checked at least two items and only one veteran failed to check any. Conversely, we may conclude that at least 90 per cent of the respondents would like to have something added to the diploma.

Achievement.-- Items 1, 2 and 3 deal with achievement and vary only in the degree to which details are expressed. A photostatic copy of the complete record would automatically include courses completed and average marks achieved in each subject. Those who checked item one were more concerned with the courses completed than the marks and those who checked item two were more concerned with the degree of achievement, but both were interested in details of the curriculum pursued. Likewise, those who checked item three were interested in even more details. Table 5 shows that 75 persons (37.1 per cent of all respondents) approve a photostatic copy of the complete record.
The exact details are not clear due to the quality of the image. It appears to be a page from a document with text written in a paragraph format. The text is not legible enough to transcribe accurately.
Sixty-nine persons (34.1 per cent) did not check item one, two or three. Conversely, 65.5 per cent of the respondents checked at least one of the first three items. Perhaps it is significant, yet not surprising, that eighty-three per cent of the veterans approve a photostatic copy of the school record.

Conduct and effort.-- Seventy-one persons (35.5 per cent) checked this item. It is interesting to note that 44 per cent of the pupils think this addition is desirable. Teachers are least concerned with this item although twenty per cent checked it.

Attendance and punctuality.-- Sixty-nine persons including 46 per cent of the pupils checked item 5. Fifty-five per cent of the ex-servicemen expressed approval.

Extra-curricular activities.-- Forty-eight per cent of the pupils feel that item six is desirable, whereas the other groups are less concerned. The pupils likewise show a desire to have recognition given to positions held in the various activities. Nearly half of the employers also checked this item.

Personal ratings.-- Sixty per cent of the employers checked this item but only 28.2 per cent of the total respondents expressed a desire for them.

Special abilities.-- Thirty-six and one half per cent of all respondents check item 12. Employers are concerned with this item and "personal ratings" more than
### Table 5. Number of proposed additions checked.

<table>
<thead>
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<th>Proposed Additions</th>
<th>Group a/</th>
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<tr>
<td>1. Courses satisfactorily completed</td>
<td>10</td>
</tr>
<tr>
<td>2. Average marks achieved</td>
<td>9</td>
</tr>
<tr>
<td>3. Photostatic copy of record</td>
<td>11</td>
</tr>
<tr>
<td>4. Conduct and effort</td>
<td>15</td>
</tr>
<tr>
<td>5. Attendance and punctuality</td>
<td>12</td>
</tr>
<tr>
<td>6. Extra curricular activities</td>
<td>6</td>
</tr>
<tr>
<td>7. Degree of success in (6)</td>
<td>2</td>
</tr>
<tr>
<td>8. Positions held in (6)</td>
<td>2</td>
</tr>
<tr>
<td>9. Out of school activities</td>
<td>6</td>
</tr>
<tr>
<td>10. Personal ratings</td>
<td>6</td>
</tr>
<tr>
<td>11. Record of achievement tests</td>
<td>9</td>
</tr>
<tr>
<td>12. Special abilities</td>
<td>11</td>
</tr>
<tr>
<td>13. Work experience</td>
<td>3</td>
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<tr>
<td>14. Vocational plans</td>
<td>3</td>
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<td>15. Date of birth</td>
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</tr>
<tr>
<td>16. Birthplace</td>
<td>10</td>
</tr>
<tr>
<td>17. Occupation of parent</td>
<td>1</td>
</tr>
<tr>
<td>18. Racial origin</td>
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</tr>
<tr>
<td>19. Favorite hobby</td>
<td>3</td>
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<tr>
<td>20. Apparent general health</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>143</td>
</tr>
</tbody>
</table>

*a/ Groups 1, 2 and 3; 50 persons each, Group 4; 28 persons, Group 5; 24 persons.
any other group. Fifty per cent of the pupils reacted favorably to this item which indicates their desire to secure permanent recognition of special talents.

Work experience.— Nearly half of the employers but only 18.5 per cent of all respondents checked this item.

Date of birth.— Fifty-one persons (25.3 per cent) feel that this item is desirable.

Birthplace and racial origin.— Thirty-six persons feel that the birthplace of the pupil is a desirable addition. H. J. Kroipsch whose check list was returned after the tabulation had been completed, emphasizes a good point which may apply to both birthplace and racial origin. He states that the inclusion of this information would violate the principles of the Fair Employment Practice Code. Certainly any item which might lead to racial discrimination should not be considered a valid part of a diploma.

Apparent health.— Employers are most interested in this item.

Others.— Very little interest is indicated in the degree of success in various activities, out-of-school activities, record of achievement tests, vocational plans, occupation of parents, racial origin or favorite hobby.

Suggested additions.— The following additions were proposed by respondents:—
1. Include words "high honors" and "honors" whenever they apply.
2. Pupils intelligence quotient.
3. Teacher's description of the pupil.
4. Record of social attitudes
5. Statement of college units passed.

Three persons indicated "honors" as desirable and suggested that such records should appear on the face of the diploma.

Order of ten most frequently checked items.--- Re-arranging the list in the order of descending frequency of checked items we obtain the following table.

Table 6. Order of most frequently checked items.

<table>
<thead>
<tr>
<th>Item</th>
<th>Responses</th>
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</thead>
<tbody>
<tr>
<td>Item</td>
<td>Number</td>
</tr>
<tr>
<td>1 Photostatic copy of record.</td>
<td>75</td>
</tr>
<tr>
<td>2 Special abilities.</td>
<td>73</td>
</tr>
<tr>
<td>3 Courses satisfactorily completed.</td>
<td>72</td>
</tr>
<tr>
<td>4 Conduct and effort.</td>
<td>71</td>
</tr>
<tr>
<td>5 Attendance and punctuality.</td>
<td>69</td>
</tr>
<tr>
<td>6 Average marks achieved.</td>
<td>67</td>
</tr>
<tr>
<td>7 Extra-curricular activities</td>
<td>67</td>
</tr>
<tr>
<td>8 Personal ratings.</td>
<td>57</td>
</tr>
<tr>
<td>9 Date of birth</td>
<td>51</td>
</tr>
<tr>
<td>10 Positions held in Extra-curricular.</td>
<td>48</td>
</tr>
</tbody>
</table>

This appears to indicate that the respondents were more interested in achievement and special talents than any other item. In other words, they would add sufficient information to the diploma to obviate the present uniformity and to portray the actual accomplishments of the graduate.
Location of proposed additions.-- The respondents "voted" 106 to 60 to provide a separate statement of credit rather than use the back of the diploma. Some of the comments are of interest but none of them warrant serious consideration. Several are given herewith to show the general trend.

a. "Framing would hide the record."
b. "Photostat is easily kept."
c. "Less likely to be lost if on the back of the diploma."
d. "Does away with need for birth certificate."
e. "Gives value to diploma when seeking employment."

Type of diploma preferred.-- One hundred and forty-five respondents, nearly 75 per cent favor the folder type of diploma and two thirds of them approve the present pocket size. Twenty-five persons favor the flat type for framing with a size larger than 4 inches by 6 inches preferred. Ten persons checked this size and 15 others gave various sizes up to 14 by 18 inches. The average size suggested is 6.5 by 11 inches. It should be noted that this is much smaller than the size in common use sixteen years ago. "The modal size, 14 inches by 17 inches" was reported by Reavis and Lund in 1930. Evidently the trend is toward smaller flat diplomas and toward 4 inches by 6 inches folder-type diplomas.

Adornments.-- Responses to Part B of Section V show that about half the respondents recommend the use of school colors with the diploma and slightly over half desire the

school seal on the diploma. Parents and pupils are more interested in these items than the other groups; in fact, many teachers and employers wrote "not interested in these questions." Two persons suggested the state seal for the diploma and two, a picture of the graduate.
CHAPTER IV

SUMMARY AND IMPLICATIONS

Summary.-- The scarcity of literature about the high-school diploma has caused this study to become a personal investigation of the opinions of local persons concerning it. The preliminary consideration of the number and marks of Quincy graduates produced several note-worthy factors which relate to the general problem. The response to the check list indicates several desirable changes in the present high-school diploma.

Chapter I which is devoted largely to the history and development of the diploma, presents evidence that the same type of diploma has been in general use in New England for ninety years, in spite of the recent changes in secondary education. Numerous earnest attempts to introduce a diploma which indicates the actual achievement have not been generally accepted.

The increased enrollment in the twelfth grade is described in Chapter II. This growth has resulted in the retention of more pupils until graduation. It was caused by unemployment conditions and the plea to the schools to keep young people "off the street." Educators sought to meet the challenge by making provision for individual differences; however, the diploma made no allowance for
them. World War II has caused another shrinkage in enrollment because this group find employment more alluring than school attendance.

In spite of the increased enrollment the mean of the marks of graduates remained about the same (average 74.13 per cent), for twenty years. Evidently standards must have been lowered to maintain this average. The spread of the average marks of several widely separated classes indicates that the distribution has remained about constant with the "hump" of the curve falling below the mean.

The age of graduates has remained nearly constant for twenty years. The slight decrease would indicate that there is a tendency to graduate more pupils who reach the twelfth grade rather than retain them for an extra year. This may seem to be arbitrary graduation, but even though it may be desirable, it would appear wise to grant them a diploma expressing facts.

Perhaps the most significant fact of the whole survey is the fact that 90 per cent of the respondents would like to have something added to the diploma. They agree that the information should be placed on a separate statement of credit rather than on the diploma.

The addition checked most frequently is a "photostatic copy of complete record". To determine what should constitute a complete record, would require further research. However, the trend of such information is indicated by the items checked most frequently. The
any of my notes on this matter, or file any claim.

The next day, I arrived at the hospital and was able to see the patient again. It seemed that the condition was improving, but the doctor warned me that there could be complications. I decided to stay in the hospital until I could be sure that the patient was out of danger. I spent several days attending to the patient, and eventually, I was able to bring him home with me. We did not return to our normal routines, but we managed to make do.

I continued to work on the case, trying to get to the bottom of the matter. Eventually, I was able to uncover the truth. It was a matter of some urgency, as the situation could have serious implications. I was determined to see it through to the end, and I was grateful that I had a strong team to support me. In the end, justice was served, and the patient was able to begin his road to recovery.
following items are considered as valuable information for such a record: special abilities, such as speed in typewriting and talent in art; courses satisfactorily completed and average marks achieved in each subject; statement of conduct and effort; a statement of attendance and punctuality; list of extra-curricular activities and the positions held in each, such as, manager or president; personal ratings by teachers, (provided they can be largely objective), and date of birth.

The data obtained indicates that 75 per cent of the respondents favor a 4 x 6 inches folder type of diploma, and about half of them consider the school seal and school colors as desirable features.

Finally employers and veterans are more concerned with diploma additions than the other groups and the parents and pupils are least concerned. This would indicate that there is no better time than the present to introduce a change in the diploma. The argument that a uniform diploma is more democratic is hardly borne out by the facts. Servicemen, regardless of rank, are proud to display their achievement certificates from the armed services whether they were rated high or low. Furthermore, the diploma becomes the personal property of the recipient and he need not show it to anyone, unless he wishes to do so.
Tentative conclusion.— The majority of the persons surveyed are of the opinion that a separate statement of credit should accompany the regular high school diploma and they feel that a photostatic copy of the school record is the most desirable form.
APPENDIX A

1. The Check List
2. List of Parents' Occupations
3. List of Types of Employers
January 2, 1946

Dear Fellow-Citizen:

WHAT FACTS SHOULD A HIGH SCHOOL DIPLOMA CONTAIN?

Every youth in America is being urged to secure a high school diploma. In recent years, many factors have contributed to an increased school population especially at the high-school level. More pupils remain in school until the age of eighteen and to many of them, the diploma, itself, has become the objective goal, rather than educational achievement. "Getting by" is their slogan. Because of the wide range of ability, and the variability of the curriculums represented by the present diploma, colleges and employers are requesting copies of the school records.

This study is intended to secure an opinion from interested persons concerning possible changes in the conventional type of diploma. Will you kindly take a few minutes to read and check the accompanying list. Please return as soon as possible.

Yours truly,

GEORGE A. WILSON
96 Revere Road
Quincy 69, Massachusetts
CHECK LIST FOR HIGH SCHOOL DIPLOMA STUDY

I. Nature of the present diploma

QUINCY HIGH SCHOOL

Seal

-Quincy

of

City

of

Massachusetts

This certifies that

John Doe

has honorably completed the course of study for Graduation from this School and is therefore awarded this DIPLOMA

Given this day of June, one thousand nine hundred and forty--

Principal

Mayor

Superintendent

You will note that ten important facts are given: (1) name of school, (2) name of city, (3) name of state, (4) name of graduate, (5) reason for award of diploma, (6) name of course, (7) date of graduation, (8) signature of mayor, (9) signature of superintendent, (10) signature of principal.

II. Proposed desirable omissions

A. Do you think any of the above items are unnecessary? If so, what would you omit? (Use numbers)
III. Proposed desirable additions

A. Please check any of the items below which you feel should be added to the present diploma to make it useful.

Check here

( ) 1. Names of courses (subjects) satisfactorily completed
( ) 2. Average marks achieved in each subject; such as, English and history
( ) 3. Photostatic copy of complete record
( ) 4. Statement of conduct and record
( ) 5. Statement of attendance and punctuality
( ) 6. Statement of extra-curricular activities; such as, hockey and band
( ) 7. Statement of degree of success in extra-curricular activities
( ) 8. Statement of positions held: such as, manager and secretary
( ) 9. Statement of out-of-school activities; such as scouts and local clubs
( ) 10. Statement of personal ratings; such as, initiative
( ) 11. Record of achievement tests
( ) 12. Record of special abilities; such as, speed in shorthand, excellence in art
( ) 13. Work experience while in school, if any
( ) 14. Vocational plans
( ) 15. Recorded date of birth
( ) 16. Birthplace
( ) 17. Occupation of parent
( ) 18. Racial origin
( ) 19. Favorite hobby
( ) 20. Apparent general health
( ) 21. Other, enter here
( ) 22. Other, enter here

IV. Do you think such items as you have checked might be put on a separate statement of credit rather than on the back of the diploma?

( ) Yes ( ) No  Comment

V. Related questions
A. Please check below the type of diploma you prefer.

( ) 1. Folder type (4" x 6") pocket size
( ) 2. Folder type (5" x 9")
( ) 3. Flat type (4" x 6")
( ) 4. Flat type (enter size preferred here x )

B. Please check these items if you approve them.

( ) 1. School colors should be attached to the diploma
( ) 2. The school seal should be stamped on the diploma
( ) 3. Other

Signature (optional)
### Thirty Seven Different Occupations Represented by Parents (Group 1)

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salesmen</td>
<td>7</td>
</tr>
<tr>
<td>Carpenter</td>
<td>3</td>
</tr>
<tr>
<td>Electrician</td>
<td>2</td>
</tr>
<tr>
<td>Machinist</td>
<td>2</td>
</tr>
<tr>
<td>Mail carrier</td>
<td>2</td>
</tr>
<tr>
<td>Manager</td>
<td>2</td>
</tr>
<tr>
<td>Shoeworker</td>
<td>2</td>
</tr>
<tr>
<td>Architect</td>
<td>1</td>
</tr>
<tr>
<td>Foreman</td>
<td>1</td>
</tr>
<tr>
<td>Boiler-maker</td>
<td>1</td>
</tr>
<tr>
<td>Bus Driver</td>
<td>1</td>
</tr>
<tr>
<td>Captain (ship)</td>
<td>1</td>
</tr>
<tr>
<td>Contractor</td>
<td>1</td>
</tr>
<tr>
<td>Draftsman</td>
<td>1</td>
</tr>
<tr>
<td>Floor-layer</td>
<td>1</td>
</tr>
<tr>
<td>Funeral Director</td>
<td>1</td>
</tr>
<tr>
<td>Galvanizer</td>
<td>1</td>
</tr>
<tr>
<td>Grocer</td>
<td>1</td>
</tr>
<tr>
<td>Guard</td>
<td>1</td>
</tr>
<tr>
<td>Investigator</td>
<td>1</td>
</tr>
<tr>
<td>Inspector</td>
<td>1</td>
</tr>
<tr>
<td>Janitor</td>
<td>1</td>
</tr>
<tr>
<td>Marker</td>
<td>1</td>
</tr>
<tr>
<td>Mechanic</td>
<td>1</td>
</tr>
<tr>
<td>Minister</td>
<td>1</td>
</tr>
<tr>
<td>Naval Officer</td>
<td>1</td>
</tr>
<tr>
<td>Paint sprayer</td>
<td>1</td>
</tr>
<tr>
<td>Plasterer</td>
<td>1</td>
</tr>
<tr>
<td>Plumber</td>
<td>1</td>
</tr>
<tr>
<td>Policeman</td>
<td>1</td>
</tr>
<tr>
<td>Printer</td>
<td>1</td>
</tr>
<tr>
<td>Professor</td>
<td>1</td>
</tr>
<tr>
<td>Rigger</td>
<td>1</td>
</tr>
<tr>
<td>Salvationist</td>
<td>1</td>
</tr>
<tr>
<td>Shipfitter</td>
<td>1</td>
</tr>
<tr>
<td>Sprinkler-fitter</td>
<td>1</td>
</tr>
<tr>
<td>Stone cutter</td>
<td>1</td>
</tr>
</tbody>
</table>
TYPES OF INDUSTRY OR BUSINESS REPRESENTED

BY EMPLOYERS (GROUP 4)

Automobile sales and service
Girl Scout Headquarters
Small clothing store
Small store
Large insurance company
Large industrial concern
Large grocery store
Small insurance company
Hardware store
Small jewelry store
Repair garage
Chamber of Commerce
Printing office
Large Bank
Large electrical supply house
Sporting goods store
Public Library
Five and ten cent store
Two tobacco wholesalers
Large department store
APPENDIX B

Calculations of
Standard Deviations of Marks
of Several Classes
### Calculation of Standard Deviation of the Marks of 149 Graduates of the Class of 1922 at Quincy High School.

<table>
<thead>
<tr>
<th>Class Interval</th>
<th>Frequency (f)</th>
<th>Deviation (fd)</th>
<th>fd^2</th>
</tr>
</thead>
<tbody>
<tr>
<td>84 - 91</td>
<td>4</td>
<td>5</td>
<td>100</td>
</tr>
<tr>
<td>86 - 88</td>
<td>9</td>
<td>4</td>
<td>144</td>
</tr>
<tr>
<td>88 - 95</td>
<td>7</td>
<td>3</td>
<td>63</td>
</tr>
<tr>
<td>90 - 92</td>
<td>17</td>
<td>2</td>
<td>68</td>
</tr>
<tr>
<td>92 - 99</td>
<td>16</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>127</td>
</tr>
<tr>
<td>74 - 76</td>
<td>23</td>
<td>0</td>
<td>34</td>
</tr>
<tr>
<td>71 - 73</td>
<td>34</td>
<td>-1</td>
<td>34</td>
</tr>
<tr>
<td>68 - 70</td>
<td>24</td>
<td>-2</td>
<td>48</td>
</tr>
<tr>
<td>65 - 67</td>
<td>9</td>
<td>-3</td>
<td>27</td>
</tr>
<tr>
<td>62 - 64</td>
<td>1</td>
<td>-4</td>
<td>4</td>
</tr>
<tr>
<td>59 - 61</td>
<td>5</td>
<td>-5</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>125</td>
</tr>
<tr>
<td><strong>N</strong> = 149</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>( \Sigma fd )</strong> = -11</td>
<td>( \Sigma fd^2 )</td>
<td>743</td>
<td></td>
</tr>
</tbody>
</table>

Assume \( M = 75 \)  
Mean = 75 - 0.0739 = 74.93

\[
\frac{\Sigma fd}{N} = \frac{-11}{149} = -0.0739 = c \\
\sigma^2 = 0.00546 \\
\frac{\Sigma fd^2}{N} = \frac{743}{149} = 4.9865 \\
SD = 3 \sqrt{4.9865} = 3 \sqrt{0.055} = 74.93 + 3.35 = 78.28 \\
= 3 \sqrt{4.981} = 74.93 - 3.35 = 71.58 \\
SD = 3 \times 2.23 = 6.69
\]
CALCULATION OF STANDARD DEVIATION OF THE MARKS
OF 365 GRADUATES OF THE CLASS OF 1932
AT QUINCY HIGH SCHOOL.

\[
\begin{array}{cccc}
\text{c1} & \text{f} & \text{f1} & \text{f1}^2 \\
89 - 91 & 7 & 6 & 42 & 252 \\
86 - 88 & 13 & 5 & 65 & 325 \\
83 - 85 & 20 & 4 & 80 & 320 \\
80 - 82 & 82 & 3 & 96 & 288 \\
77 - 79 & 49 & 2 & 98 & 196 \\
74 - 76 & 52 & 1 & 52 & 52 \\
71 - 73 & 79 & 0 & 0 & 0 \\
68 - 70 & 57 & -1 & -57 & 57 \\
65 - 67 & 39 & -2 & -78 & 156 \\
62 - 64 & 12 & -3 & -36 & 108 \\
59 - 61 & 5 & -4 & -20 & 80 \\
- & N = 365 & -191 & 1834 \\
\end{array}
\]

Assumed \( M = 72 \)  \( \text{Mean} = 72 + .69 = 72.69 \)

\[
\frac{\sum f d}{N} = 0.69 \]
\( \sigma = 6.39 \)
\( \sigma_n = 3.20 \)
\( \sigma_n = 9.59 \)

\[
\frac{\sum f d^2}{N} = 1834 \]
\( \sum f d^2 = 5.00 \)
\( 72.69 + 3.20 = 75.89 \)
\( 72.69 + 9.59 = 82.28 \)
\( 72.69 - 3.20 = 69.49 \)
\( 72.69 - 9.59 = 63.10 \)

\[
\text{SD} = \sqrt{\frac{5.00 - .48}{4.52}} = 6.39
\]

\[
\text{SD} = 3 \times 2.13 = 6.39
\]
CALCULATION OF STANDARD DEVIATION OF THE MARKS
OF 341 GRADUATES OF THE CLASS OF 1945
AT QUINCY HIGH SCHOOL.

\[
\begin{array}{cccccc}
92 - 94 & 2 & 6 & 12 & 72 \\
89 - 91 & 5 & 5 & 25 & 125 \\
86 - 88 & 16 & 4 & 64 & 256 \\
83 - 85 & 24 & 3 & 72 & 216 \\
80 - 82 & 26 & 2 & 52 & 104 \\
77 - 79 & 47 & 1 & 47 & 47 \\
74 - 76 & 23 & 0 & 23 & 272 \\
71 - 73 & 69 & -1 & -69 & 69 \\
68 - 70 & 57 & -2 & -114 & 228 \\
65 - 67 & 21 & -3 & -63 & 189 \\
62 - 64 & 1 & -4 & -4 & 16 \\
\end{array}
\]

\[
N = 341 \quad \sum d = 22 \quad \sum d^2 = 1322
\]

Assume \( M = 75 \)  Mean = 75 \( + 0.07 = 75.07 \)

\[
\frac{\sum d}{\sqrt{N}} = \frac{22}{341} = 0.07 \quad \sigma = 5.91
\]

\[
c^2 = 0.0049 \quad \sigma^2 = 3.88
\]

\[
\frac{\sum d^2}{N} = \frac{1322}{341} = 3.88
\]

\[
SD = 3 \sqrt{3.88} = 6.69
\]

\[
8.0 \quad SD = 5.91
\]
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Kambour, Theodore, "Differentiated Diplomas" School Executive (March 1937) 56:266-7


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