A COMPARISON OF COSTS OF GRAPHIC ARTS
WITH OTHER INDUSTRIAL ARTS AREAS

by

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A COMPARISON OF COSTS OF GRAPHIC ARTS WITH OTHER INDUSTRIAL ARTS AREAS

CHAPTER I

INTRODUCTION

Since World War II, the writer has noticed that graphic arts education has become much more difficult to promote among schools and administrators. At present, when a new industrial arts program is established in a school, and not enough money is available to include all areas of industrial arts, graphic arts is usually one of the first shops excluded from the program.

Many reasons have been given by administrators for this exclusion. Some say that today the cost of equipping the graphic arts shop is too great, and the cost of maintaining that shop after it has been established is too excessive in comparison with other areas of industrial arts. A shortage of good teachers is sometimes given as the reason for the exclusion. The old problem of too much production in the school graphic arts shop has also been listed. When heavy production is being done, the students do not learn much about graphic arts, but get into the role of production men if they have any talent at all. The others more or less shift for themselves.
Some administrators say that if they spend the huge sum necessary for graphic arts equipment, the machinery should be used to print school forms that are needed. In some cases there has been no demand for the course, and in some cases, pressures from community organizations have stood in the way of a graphic arts program.

It also has been noted in California that a trend seems to be appearing in the order in which industrial arts shops are being established, particularly if all areas of industrial arts are not included in the program. The trend seems to be that shops are established in the following order: woodshop, drafting, general metal, and crafts. One of the purposes of this study is to determine the reality of this trend. In the writer's district and a neighboring district, in which schools are being opened in September 1955, the first shops included have been drafting and woodshop. The other shops have not even been considered. When the schools enlarge, other areas will be included according to the present plans for the future. The University of California at present requires high school drafting courses for all students who will enter the engineering field. This is probably one reason why drafting is one of the first to be included in the program in most schools of California.

The definition of general education in its broadest
sense includes all the curricular and extracurricular activities offered by a school system in order that human beings may acquire the essential skills, knowledge, and attitudes demanded by their social environment. Specifically, general education is designed to develop functional understandings of essential elements of life and society which people must possess to live normal and happy lives (9, p.13). Therefore, general education is intended for every youth, not merely a chosen few. It is concerned with the total personality of the youth, and not merely with his intellect. It is also concerned with his preparation for effective living in our society, no matter on what level of that society he may live, or what vocation he may have hopes of going into upon termination of schooling.

Industrial arts has been defined many ways, but for present purposes it may be defined as that part of general education concerned with satisfying man's innate desire to construct things with tools and materials and developing an intelligent understanding of our modern civilization and the problems which have resulted from it (6, p.3).

Industrial arts education has nine suggested objectives, common to industrial arts literature. They are presented in summary form below (2, p.18).
1. Interest in industry.

2. Appreciation and use
   a. Develop appreciation for good design, workmanship, and the ability to select, care for, and use industrial products wisely.


4. Cooperative Attitudes.

5. Health and Safety.

6. Interest in Achievement.

7. Orderly Performance.

8. Drawing and Design.


Today industrial arts is an accepted part of general education. We know that one of the most important objectives of general education is the transmitting of a culture or "way of life;" therefore, industrial arts is included in the general education program because it too attempts to orient youth to live in a highly industrialized society. The industrial arts program also makes a substantial contribution in meeting the basic requirements of individuals in the field of personal needs, and economic vocational needs.

In the senior high school today, graphic arts education is a general subject based on laboratory methods, or practice. Students taking graphic arts not
only receive a cultural education, consumer education and self-exploration values, but receive avocational values also.

Chemistry and physics are related to the high school program as a part of general education on a laboratory basis. However, students who take these subjects do not necessarily become chemists or physicists; nor do students who take graphic arts education become printers, unless they happen to discover that they have real talent for this particular field.

The history of printing is a story in itself of the advancement of universal education. Before printing was invented, only the very elite, and monks in the scriptoriums were educated. The advent of printing opened up to the masses, through books, a chance for education. Just as printing has aided civilization to emerge from the weak, unlettered confusion of the dark ages, so graphic arts must carry on to build a new advanced civilization. It is a powerful moving force behind all of education today.

Printing, by spreading knowledge and enlightenment, becomes the very basis of our whole system of universal education. Through man's use of the printed word, his success or failure in life will be realized, be it commerce, industry, or trade.
Graphic arts, which is included in the industrial arts area—a part of general education—will help students to further acquire knowledge of English composition, grammar, spelling, punctuation, vocabulary-building, industrial mathematics, art, history, geography, and other related subjects. Graphic arts will also materially contribute to applied science, consumer education and safety education. It deals with general informational values, stimulates analytical and creative mentality, develops leadership, and character, and stimulates leisure time activities.

The graphic arts education on the industrial arts level is one medium through which the Seven Cardinal Aims of Education may be given real living values. These aims are: health, command of fundamental processes, ethical character development, worthy use of leisure time, worthy citizenship, vocational adjustment, and worthy home membership. See chart, Figure I, page 7 (1, p.9).

PURPOSE

The purpose of this study is to determine whether certain criticisms, that have been continually heard among the graphic arts teachers in California, have any real bearing upon graphic arts education in that state.
Figure I

The Seven Cardinal Aims of Secondary Education
As Attained Through The Industrial Arts—Graphic Arts Laboratory

Source: Graphic Arts The Foundation of A Liberal Education. American Type Founders.
This study was conceived because of a problem that seems to be facing many county supervisors in establishing and promoting the graphic arts program among schools and school districts. The supervisor of Los Angeles County has had an increasingly difficult job in promoting this program among school administrators. It is difficult to understand the change that has come into their thinking when most Southern California high schools have graphic arts courses.

Therefore, this study was made to determine the reasons for the exclusion of graphic arts from the industrial arts program. Particularly when the Biennial Survey of Education in the United States, 1948-50, (12, p.63) indicates the number of students enrolled in graphic arts education ranks fifth in industrial arts subjects. This is particularly interesting when one considers that there are not as many graphic arts shops as other types of industrial arts shops in the United States. These figures are the most comprehensive available at this time, but do not present a particularly true picture because of the fact that full-year courses are included in them.

One objective of this study is to determine if there is any basis for the belief that there is a common order in the establishment of the industrial arts shops.
Why does it seem that woodshop and drafting are usually the first shops established if the whole program is not established at once? Is the graphic arts program too costly to establish and operate? What is the actual cost of graphic arts in comparison to other shops?

It also seems wise to determine if there are other reasons behind exclusion of graphic arts outside of the cost factor. If the graphic arts shop was established, was it upon the basis of the sound objectives of industrial arts education, or was it established just to do the school's printing and thus save the school district a considerable sum of money.

Another purpose of the study is to determine if all schools handle production printing and even print for some community charitable organizations. How many schools do not do production printing, but devote all time and effort to planned learning activities. Lastly, the study attempts to determine how many students take beginning courses in graphic arts, advanced courses in graphic arts, and how many students enter graphic arts industry upon graduation from high school.

DEFINITION OF TERMS

Graphic Arts: Graphic arts in the industrial arts program involves experiences contributing to further
appreciation, understanding, and abilities having to do with the printing, duplicating, photographic, and binding industries; their products and how they affect everyday life (2, p.69).

Printing: A term used to designate the area of composition, presswork, (both automatic and hand-fed), automatic typesetting, and bindery work.

Production Printing: A term used to designate the printing of forms for the school, by the graphic arts shop.
CHAPTER II

PROCEDURE

The procedure was a normative-survey method using as many personal interviews as possible to supplement a questionnaire. The study was limited to the State of California because of the large number of graphic arts shops in the high schools and junior high schools of that state. In Southern California, practically all high schools and junior high schools have graphic arts departments. In Northern California this is not quite the case, but the graphic arts program is in operation in that area, also.

Questionnaires were sent to high schools that were known to have graphic arts programs, and to schools that were known not to have graphic arts programs. This was done primarily to determine the reasons why some schools established graphic arts programs, and why other schools did not.

Fifty questionnaires were sent out early in the spring semester to city school supervisors, department heads of high schools, and to county supervisors. Out of the fifty that were sent out, forty were returned, which made an 80 per cent return for the study.

Of the forty questionnaires that were returned,
all were usable to some degree. One school did not answer the questionnaire, but wrote a letter containing information that was used in making the analysis. Schools that did not return the questionnaires were contacted again by telephone, and post cards. Many supervisors were contacted personally when they attended state and local meetings at which the writer was also present.

The supervisor of the San Diego School District, the supervisor of the Pasadena School System, the department chairman of the El Monte Union High School District, the superintendent of the Covina High School, the supervisor of the Burbank City Schools, and the supervisor of the Glendale School District were interviewed personally by the writer. The questionnaire was taken directly to the supervisor or administrator in his office and each question was discussed. The data were recorded directly onto the questionnaire. The interviews required from an hour to an hour and a half.

Upon conclusion of the interview, the questionnaire and the results were added to the data of the other questionnaires. The administrator who was being interviewed carefully looked up the figures in the school files to make sure they were the actual latest figures on record.
The data were tabulated on a separate sheet. For instance, in the tabulation of the cost of equipment, each cost reported was entered upon a sheet and carefully recorded. Then the totals were added to find the number of responses. The lowest figure, the highest figure and the median were then determined.

The distribution of the schools reporting was interesting. Fifteen schools from Northern California participated. Of that fifteen, ten schools were from rather large districts and five were schools from small districts. The smaller schools had an enrollment under 1,000 students. Seventeen schools reporting were within a fifty-mile radius of Los Angeles. Practically all of those schools were in large districts. Three schools reporting were from areas east of Los Angeles, either on the fringes of the desert or actually in the desert area. The other five schools were located in the San Diego area or in the San Joaquin Valley area. The San Diego schools are large districts, while those schools reporting from the San Joaquin Valley are small.

Both large and small schools were represented in the survey. Collectively, they represented a wide area of California.

After the questionnaire was prepared, the
Los Angeles County Supervisor was consulted and asked to criticize the materials included in it, so that it could be revised before it was sent throughout the state.

The questionnaire and letter as sent out in the mail and used for personal interviews are reproduced in Appendix B.
CHAPTER III

COMPARISON OF COSTS

Comparison of costs of the nine areas of industrial arts as surveyed in this study shows wide variance in the range of the figures reported for initial equipment and supplies. From an analysis of the situation, it appears that in areas where the economic and social patterns differ, the schools will differ in administration, organization, and specific curriculum content (10, p.48). Thus, there are many factors behind the wide variance of the figures. Economic situations in the large, congested city areas are far different from those of a rural high school with 200 students.

Financing systems vary widely with each school district. The assessed valuation of property tax fluctuates from year to year, making school revenues go either up or down. Educational philosophies of the school administration and teacher will have a profound effect upon the monies spent for equipment and supplies. School districts that are predominately residential are not as rich as those districts that have a huge amount of manufacturing within their boundaries.

Class size determines to a great extent what amount of money will be spent for supplies. Outside
pressures from community organizations affect the kind and quality of equipment that will be installed. Those schools that are located near large cities will find that printing equipment is cheaper to buy than schools located in remote areas where transportation costs are higher.

One of the big factors in determining the cost of equipment is the emphasis given to printing. If printing is stressed, much equipment and supplies are necessary. If the emphasis is upon graphic arts, the equipment used is much less and not as costly as the printing program in which production of school materials runs costs higher.

The cost of equipment also depends on whether the program is a vocational or an industrial arts program. Setting up a vocational program usually runs the cost of the program a little higher because of the philosophy for trade training. However, in some cases, a vocational program and an industrial arts program use the same shop facilities.

Another factor that has a tendency to influence costs is the fact that in the graphic arts industry there are not many manufacturers of the smaller printing equipment. For example, the hand-fed platen press. Chandler and Price Manufacturing Company is the only company that manufactures this type of press. Therefore, when one submits bids for the purchase of the equipment,
each bidder must buy the press from the manufacturer or his distributors. This eliminates drastic price cutting to secure the low bid, so the bids come back with virtually the same prices. Another example is found in the type setting machines. Intertype Company and Mergenthaler Linotype Company are the only two manufacturers of this equipment.

The other areas of industrial arts which require machinery will be favored by a much greater competition among manufacturers. In these areas schools may receive a substantial reduction in price because the manufacturer wants to place his equipment in the school.

Economic and social factors affect school financing; it can therefore be expected that a large difference in the range of figures would be reported. Even though this was the case, the figures reported gave a criterion for comparing the costs of the nine areas of industrial arts.

**HIGH SCHOOL**

Machine Shop. From the results that were reported on the questionnaires, it was found that machine shops are the costliest of all the industrial arts shops, to equip and maintain. One school reported that its equipment cost $1,500, while another school reported its
equipment cost $125,000. There were a variety of other cost figures ranging between the above two figures with the median at $32,375.

One might say that today in California, very few new schools are establishing a unit machine shop. They are combining machine shop with the general metals area. Two schools reported a figure of $17,000 and $45,000 for equipment for this combined shop. The supervisors of Los Angeles County no longer promote the machine shop as a unit shop, but establish the above combination. Therefore, this new trend will eventually have a profound effect upon the financing of this area.

Woodshop. Woodshop equipment was second highest in cost of all areas that reported. It is significant that this shop and its equipment ran second in cost since it has always been classified by many administrators as one of the cheaper areas of industrial arts.

The cost of equipment, as reported, was from $3,000 to $80,000, with the median at $12,753. Two schools reported that their equipment cost $30,000; three schools reported $10,000; three schools reported $8,000, and two reported $4,000.

One school reported a wood-general metal combination with equipment costing $7,000.
Graphic Arts. The equipment for the graphic arts shop was the third in cost as reported by those questionnaires returned. This is surprising since one reason for exclusion of the graphic arts from the industrial arts program was the excessive cost of the initial equipment. The costs of equipment ran from a low figure of $1,000 to a high figure of $75,000; $10,000 below the top woodshop figure. The median cost of equipment from the reported figure was $9,633. There was not a very wide range in the figures from $6,000 to $25,000 which indicates that a good program can be established somewhere between those figures.

General Metal. General metal equipment was fourth out of the nine areas. The figures ran from a low of $700 to a high of $20,000. The median was $7,455 with three schools reporting equipment at $3,000, two at $7,000, two at $10,000, and two at $2,000.

One school reported a combination of general metals and electricity with a total cost of equipment at $9,300.

Auto Shop. The auto shop like graphic arts is another shop about which there are controversial opinions. It is usually not established in the curriculum for reasons that will not be discussed here. It took fifth
place on the cost scale. The low figure was $1,000 with the top figure at $10,000. The median for auto shop is $6,023. Three high schools reported their equipment as costing $3,000, four at $5,000, two at $6,000, and two at $10,000. Apparently for around $6,900, a good industrial arts auto shop program can be established as determined from the reported figures.

**Electricity.** The electric shop program figures ran fairly low, sixth in cost. The low figure was $1,000 with the high figure at $8,000, and the median at $5,900. The grouping of figures fell very close between $4,000 and $6,000. Two schools reported their equipment costing $5,000.

Electricity is sometimes combined with other shops, as stated in the section on general metals. Total cost of equipment was $9,300.

One school reported a radio shop as a unit shop with equipment costing $10,000, but this was not considered as an area of industrial arts in this study. In most schools of California, radio is taught within the electrical field, if it is taught at all.

**Drafting.** Drafting was seventh in cost out of the nine shops. This is not surprising since drafting equipment is composed of very little machinery. It
consists mostly of tables and drafting sets. The low figure was $500 with the high figure at $11,000. The median for drafting is $4,350.

The $11,000 figure seems to be somewhat out of line with the rest of the schools reporting, but in checking the type of district reporting, it was found that it is not a large district in size. There are two high schools within the district boundary, but it is a fairly wealthy district.

Five schools reported a figure of $2,000, four schools $4,000, two schools $6,000 and two schools $1,000.

Drafting occupies a unique position in most schools because the University of California now specifies high school drafting as an entrance requirement for engineering students. This has given an added incentive to this program.

Photography. This is one shop that is seldom found as a unit shop. Usually it is combined with the graphic arts program or connected with the science department and not included in industrial arts. Only six schools reported a unit shop in photography. It is eighth in position of cost of initial equipment.

Out of the six schools reporting, the low cost was $700 with a high cost of $10,000. The median is $2,560.
One school reported that the photography shop was included with the craft program. This deviates somewhat from what most schools do.

Crafts. This program is the least expensive of all nine areas of industrial arts. Schools that reported indicated a low figure of $200 and a high figure of $5,000, with the median at $2,419.

It is interesting to note that with the wide variety of projects that can be made in the craft shop, it contains the least expensive equipment. However, only fourteen schools reported a craft program in the industrial arts area.

It should be taken into consideration that these figures as reported by the various schools, do not all represent equipment that was bought in the same year. Some of the equipment was bought before World War II, and some was bought within the last ten years. Regardless of the type of equipment or when it was bought, the general cost can be estimated. Even though inflation came after World War II, equipment prices rose fairly evenly and are not out of proportion to pre-war prices.

Summarizing shop costs according to their order, as shown in the graph on page 23, it was found that
Figure II
Amount of Money Spent for Initial Equipment in High School
machine shop is by far the most costly, with woodshop, graphic arts, general metal, auto shop, electricity, drafting, photography and crafts following, in that order.

The writer has observed that those schools reporting high cost of equipment are in most cases large school districts or high schools within a large school district in which financing is much easier. The lower cost figures indicate that they were reported by small schools, including rural schools, in which the financing is more of a problem.

**Supplies.** After considering and comparing the cost of initial equipment for the nine areas of the industrial arts program, it is necessary that the operational costs of these shops be studied. From the responses on the questionnaires, it is clearly indicated that operational costs differ from cost of equipment.

**Woodshop.** Woodshop supplies ran from a low total of $375 to a high of $2,500 a school year. It was first in operational cost of supplies. The lowest figure for woodshop was a little higher than the lowest figure for graphic arts. There was a much wider spread between the figures from the lowest to the highest than either graphic arts or machine shop. See graph on page 26.
Graphic Arts. Graphic arts is in second place in cost of supplies, although it was in third position for cost of equipment. The responses indicated that the cost of supplies ran from $200 to $2,500 a year for the operation of this shop.

It could be assumed that the school reporting the $2,500 figure would be doing a considerable amount of production printing. The school with the low figure could possibly be teaching a straight graphic arts course.

Machine Shop. Machine shop again is third in cost of operation. The figures ran from a low of $250 to the high of $5,000. Machine shop is not only the most costly to establish, but also to operate.

Auto Shop. The cost of supplies for auto shop was fourth in the total number of shops. The low figure for auto shop was $100. Its high was $2,000.

Crafts. This shop, which is the least costly to establish, is a rather costly one for which to buy supplies. It rates fifth in comparison with the other areas. The low figure for crafts was $150 and the highest is $1,700. Of course, the cost would be determined to a large degree on how much of the craft field the teacher includes in his program. Probably the school reporting a $150 figure has a limited program in crafts.
Figure III
Comparison of Cost of Supplies for High School Industrial Arts
General Metal. The general metals area rates sixth in supply costs in comparison to the other areas. The low figure reported was $200 and the high figure was $1,600. This was just $100 less than the high figure of the craft program.

Electricity. The cost of equipment for electric shop was sixth in cost, but it is in seventh place in cost of supplies. The indications are that the electric program is rather costly to maintain.

Figures range from $200 to $2,000. The highest is just under the graphic arts and woodshop areas by $500.

Drafting. This area rates eighth in comparison to the others. It is holding about the same position as it did in cost of equipment. The low figure reported was $75 and the highest figure was $1,000. It may be assumed that the drafting program is a relatively cheap area to establish and operate in the industrial arts program.

Photography. Photography rates ninth in supply cost in comparison, and rated eighth in cost of equipment, so it holds about the same relative position. The low figure reported was $200 and the high was $400. It can be seen that this shop, if established as a unit shop, would be very cheap to install and operate in the
industrial arts program. However, not many schools have a unit shop in photography. In some schools, it is combined with graphic arts, in others it is found under the science department or within the area of crafts.

The general metal and machine shop combination, as reported by one school, had a cost of supplies running around the $3,000 mark. This is rather interesting to note since combining the two shops did not cost as much as the machine shop alone in another school.

**JUNIOR HIGH SCHOOL**

Surveying the junior high school field for cost of equipment, it was found necessary to limit this part of the study to six areas. The reason is that in junior high school, auto shop is not a part of the curriculum. Machine shop usually is not included in the junior high school area. One school however, did report a unit machine shop. Photography also has been limited because only one school reported that area as a unit shop. This left no way of comparing one against the other of these areas, so they have been eliminated in this analysis. The areas to be dealt with are: woodshop, general metal, graphic arts, crafts, drafting, and electricity.
Woodshop. From the responses on the questionnaires, it was shown that woodshop was the shop that cost the most to equip and establish. The low figure reported was $1,800 and the high figure was $15,000 for junior high schools. One school reported a figure of $10,000 and two schools reported $6,000. The other figures reported varied between these. Comparing these figures with the figures of the high school woodshop, it shows that in both cases woodshop is an expensive shop to equip and operate.

Graphic Arts. Junior high school graphic arts is less expensive than high school graphic arts. In junior high school it is in second position with a low figure of $1,200 and a high of $12,550. Probably the lower cost is because the graphic arts program without production printing is taught. Therefore, the equipping of the shop would be much less. However, there are a few junior high schools in the Southern California area that do production printing.

General Metals. The general metals area was in third position in cost of equipment. The lowest figure reported was $1,000; two schools reported that figure. The highest figure was $14,260. Comparing this area with the high school shop, an increase in cost can be noted.
It is probably because general metals is stressed more in the junior high school program than that of high school.

**Drafting.** Drafting in the junior high school area is fourth in cost of supplies. The cost of equipment ran from a low figure of $1,000 to a high figure of $5,600.

**Electricity.** Electric shop is again one of the lowest on the list in cost. On the high school list, it was sixth; crafts was the lowest. The cost of this equipment, as reported, ran from $1,000 as the low figure to a high of $4,300.

**Crafts.** This shop, which was one of the lowest in cost on the high school level, holds sixth position in comparison with other industrial arts areas on the junior high school level. The lowest figure reported was $300. The highest figure was $6,225. As is the general metal program, this area of the industrial arts curriculum is probably also stressed much more on the junior high school level. The school reporting $300 as cost of equipment could not have had a very extensive craft program.
Looking at the graph, Figure IV, on page 32, it can be said that the three most costly shops are wood, general metal and graphic arts. The other three—crafts, drafting, electricity—run the lowest in expense of equipment.

It must again be taken into consideration that these figures as reported by the various schools, do not represent figures for the same year. The figures vary widely throughout the years because some equipment was purchased before World War II, when there was no inflation and some after World War II. However, regardless of when the equipment was purchased, it will still give us an indication of the general costs so that they may be compared with each other. While inflation did raise costs, the cost of school equipment did not run out of proportion to other items.

An example of this can be seen in the cost of a type setting machine. Before the war, a machine could be purchased in the neighborhood of $7,000-$8,000. It was considered an expensive machine then. Today it can be purchased in the neighborhood of $12,000. It is proportionately as expensive today as it was before the war.
Figure IV

Amount of Money Spent for Initial Equipment in Junior High School
Supplies. In comparing the cost of equipment, the cost of supplying the six areas should also be noted. The amount of money it takes to operate the shop after it has been equipped is of vital importance in comparing costs. Some shops cost more to establish, but less to operate after having been established. This was noted under the high school section in which the craft shop was listed as being fifth in cost of supplies, but in ninth place in cost of equipment.

Woodshop. The cost of supplies for woodshop shows one of the highest totals of all areas. It was noted in the section under high school, that woodshop was second; machine shop was first. This indicates that the junior high school program is consistent with the senior high school program. The figures reported ran from a low of $400 to a high of $1,800.

General Metal. General metal work holds first position with woodshop in cost of supplies. It was third in junior high school in cost of equipment. The low figure was $200 and the high figure, $1,200. From the results as reported, this indicates that by comparing the high school area and the junior high area, the junior high school program is much more costly.
Figure V

Comparison of Cost of Supplies for Junior High School Industrial Arts

<table>
<thead>
<tr>
<th>MEDIUM COST</th>
<th>WOODSHOP</th>
<th>GENERAL</th>
<th>CRAFTS</th>
<th>ELECTRICITY</th>
<th>GRAPHIC ARTS</th>
<th>DRILLING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>750</td>
<td>725</td>
<td>700</td>
<td>675</td>
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<tr>
<td></td>
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<td>400</td>
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<td>325</td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>275</td>
<td>250</td>
<td>225</td>
<td>200</td>
<td>175</td>
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<td></td>
<td>150</td>
<td>125</td>
<td>100</td>
<td>75</td>
<td>50</td>
<td>25</td>
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</tbody>
</table>
Crafts. The results show that the craft shop in cost is a close third—just $75 behind general metals. The low figure was $250, while the high figure was $1,100. This compares about the same with the high school program.

Electricity. Electricity is in fourth position in supply cost. The low figure was $300 and the high not too much more—$750. Comparing this with the high school program, it is shown that the junior high school program costs somewhat more.

Graphic Arts. Supplies for the junior high school shop are less expensive than those for senior high school. In the junior high school shop it is in fifth position, whereas it is second in high school. The low figure was $250 a year with a high figure of $1,400.

Drafting. The cost of supplies for drafting ranged from a low figure of $50 to a high of $500. This proves it to be one of the least costly of all the areas, in junior high school, as it is in high school.

ORDER OF ESTABLISHING SHOPS

The questionnaire that was sent to the participating schools included a request for them to number in the order
in which they would establish new industrial arts shops. This request was asked in order to get an indication of the trend in California.

Taking the results as reported on the questionnaire, they were tabulated into choices from first choice through sixth choice. See Table I below. It can be seen that twenty-one schools rated woodshop as their first choice of establishing a shop.

**TABLE I**

ORDER OF ESTABLISHMENT AS RATED BY PARTICIPATING SCHOOLS

<table>
<thead>
<tr>
<th>Shops</th>
<th>Order of Choices 1-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woodshop</td>
<td>21 3 1 0 0 0</td>
</tr>
<tr>
<td>Drafting</td>
<td>11 5 6 2 1 0</td>
</tr>
<tr>
<td>Auto Shop</td>
<td>1 5 5 7 1 4</td>
</tr>
<tr>
<td>Machine Shop</td>
<td>2 7 4 2 1 1</td>
</tr>
<tr>
<td>General Metal</td>
<td>8 4 5 0 2 0</td>
</tr>
<tr>
<td>Electricity</td>
<td>0 3 2 4 4 2</td>
</tr>
<tr>
<td>Graphic Arts</td>
<td>2 1 3 1 3 5</td>
</tr>
<tr>
<td>Crafts</td>
<td>0 2 1 3 3 1</td>
</tr>
<tr>
<td>Photography</td>
<td>0 2 3 0 1 1</td>
</tr>
</tbody>
</table>
After tabulation, it is necessary to determine the order of rank for each shop. A value of six was assigned to first choice; a value of five assigned to second choice; a value of four assigned third choice, a value of three assigned to fourth choice; a value of two assigned to fifth choice; and a value of one assigned to sixth choice.

The values having been assigned, it is necessary to multiply the number of responses for each choice by the respective assigned values. Then each column was totaled horizontally. The largest total represents rank one, the second largest represents rank two, and so forth. See Table II, page 38.

The rank of each shop can now be determined. Table II shows that woodshop was ranked first by most schools (126), and drafting second, indicating that most schools establish a new industrial arts program by establishing the shops in the following order: woodshop, drafting, auto shop, machine shop, general metal, electricity, graphic arts, crafts, and photography. Cost of equipment and supplies seems to have little bearing upon the order of establishment.
### TABLE II

**ORDER OF SHOPS AS RANKED BY PARTICIPATING SCHOOLS**

<table>
<thead>
<tr>
<th>Shops</th>
<th>Value Assigned to Choices 1-6</th>
<th>Total Rank</th>
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<td>126 15 4 0 0 0</td>
<td>145 1</td>
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<tr>
<td>Drafting</td>
<td>66 25 24 6 2 0</td>
<td>123 2</td>
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<td>Auto Shop</td>
<td>6 25 20 21 2 4</td>
<td>78 3</td>
</tr>
<tr>
<td>Machine Shop</td>
<td>12 35 16 6 2 1</td>
<td>72 4</td>
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<tr>
<td>General Metal</td>
<td>8 20 20 0 4 0</td>
<td>52 5</td>
</tr>
<tr>
<td>Electricity</td>
<td>0 15 8 12 8 2</td>
<td>45 6</td>
</tr>
<tr>
<td>Graphic Arts</td>
<td>12 5 12 3 6 5</td>
<td>43 7</td>
</tr>
<tr>
<td>Crafts</td>
<td>0 10 4 6 6 1</td>
<td>27 8</td>
</tr>
<tr>
<td>Photography</td>
<td>0 10 12 0 2 1</td>
<td>25 9</td>
</tr>
</tbody>
</table>

**REASONS WHY GRAPHIC ARTS IS EXCLUDED**

The questionnaire sent to the schools contained the following possible reasons for the exclusion of graphic arts:

1. Excessive cost of equipment and supplies.

2. The belief that graphic arts does not educationally benefit a student as much as other areas of industrial arts.

3. Outside pressures from union or organizations in the community.

4. A shortage of graphic arts teachers.
5. Fear that the graphic arts shop may go into production printing, leaving little time for teaching.

6. No demand for the course.

Five schools checked excessive cost of equipment. Four checked that graphic arts does not educationally benefit the student. Five stated that outside pressures from the community were the reason for exclusion. Ten checked shortage of graphic arts teachers. Four felt that the shop would do production printing, leaving little time for teaching, and seven checked no demand for the course.

Some of the comments that were written in were interesting to note. One school noted that they could find graphic arts teachers, but none that could teach all aspects of the program. Another school wrote, "A personal opinion--forget graphic arts--teach printing--do school production--and the administration will be happy." One school noted the difficulty of running a good program because there were no junior high schools with a graphic arts program to initiate interest and thereby providing students for senior high school graphic arts. One other school noted in its comment that they had one graphic arts shop in one of the three high schools in that district and it seemed to be sufficient to meet the needs of the students of the entire district.
Figure VI

Reasons for Exclusion of Graphic Arts

<table>
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<tr>
<th>Number of Responses</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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<td>Shortage of Teachers</td>
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<td></td>
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<tr>
<td>No demand for the course</td>
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<td></td>
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<tr>
<td>Outside pressures</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excessive cost of equipment</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Does not educationally benefit student</td>
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<tr>
<td>Goes into production printing</td>
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</table>
Along with the cost of equipment and supplies, it is necessary to determine if those schools that have graphic arts programs based them upon the objectives of industrial arts. Also, it is important to determine if those schools that are going to establish graphic arts education in the near future will base their programs upon the objectives of industrial arts. Nine questions were asked in the questionnaire regarding the basis upon which graphic arts shops were or will be established and the results are as follows:

1. Seventeen would establish the program to give some training along a vocational line;

2. Thirty-one would establish their programs upon the objectives of industrial arts, as listed by those of authority in the field;

3. Twenty-three would establish graphic arts shops in order to offer a purely exploratory program;

4. Five shops would be established to do the school printing;

5. Nine shops would be established to satisfy a demand from the community;

6. Thirty shops would be established just to acquaint the students with the various fields of industry, with materials, products and employment opportunities;

7. Twenty-five would establish the program because graphic arts is a part of general education.
The question was raised as to whether the program would be established if the school would receive federal funds (in the case of a vocational program). No one answered the question. This could mean that none of the schools responding had a vocational program in operation.

One school responded with the statement that it included graphic arts in the program because it provided a good tie-in with other school departments such as art, journalism, English and photography.

**STUDENTS WHO TAKE GRAPHIC ARTS**

It was found that, of the forty schools reporting, 1,564 students took beginning courses in graphic arts; 747 students took advanced courses in graphic arts. Forty-seven per cent of beginning students took advanced courses. Five per cent entered industry. No one indicated whether or not these were semester courses or full year courses or whether the courses were one or two hours in length for advanced graphic arts students.

For the beginning course, no one indicated whether it was ten weeks or a semester in length. However, they reported that over a thousand took beginning courses. The responses ranged in number from eight to 400 students who took the beginning course in graphic arts. In fact, two schools reported the figure of 400.
Figures for the advanced course ranged from three to 200 students per year.

The number of students entering industry upon high school graduation was reported as ranging from one to twenty-five. Of course, it should be considered that the school that reported twenty-five was located in a large city. The school that reported one was located in a rural area. The numbers reported were directly related to the type and size of community in which the schools were located.

**COST OF OPERATING A GRAPHIC ARTS PROGRAM**

The questionnaire included the question: "How much does it cost per year to operate the graphic arts shop?" Operational costs were broken down into instructional supplies, capital outlay, maintenance, and cost of production printing for the school year. Again it must be taken into consideration that the type of program, and whether or not production printing was done, would influence the cost figures.

**INSTRUCTIONAL SUPPLIES**

The schools reported cost figures ranging from $15 to $1,500. The average is somewhat over $450.
CAPITAL OUTLAY

Capital outlay budget is the amount set aside for new equipment or items that are bought but once and not replaced. This equipment is permanent and is not consumed from year to year. The figures reported for capital outlay ranged from $30 to $1,400. The average is around $450.

MAINTENANCE

Maintenance costs ran from $30 to $1,000. The average is close to $320. No doubt the school that reported only $30 did not have too much in the way of equipment to keep up, whereas the school that reported $1,000 must have had automatic machinery.

SCHOOL PRODUCTION

The schools reported school production costs as low as $150 and as high as $2,000. This averages just about $540. The school that reported $2,000 must be doing considerable production printing.

The schools were also asked whether or not they did any production. Twenty-three schools reported that they did production work. Four reported they did not. Nineteen schools did production for the school only.
Thirteen schools did production for the district only. Twelve schools reported that they handled production for more than one school in the district. Three schools handled production work for schools outside the district, such as junior high schools and elementary schools.

One school reported that it did work for charitable organizations and some civic organizations. Another school reported that the district forms were printed during the summer months, at which time the shop was operated as a production unit with no students involved. The teacher was hired to handle the summer production.
CHAPTER IV

SUMMARY

In summarizing the results of this study, some conclusions can be deduced from the data gathered from the forty schools that participated.

JUNIOR HIGH SCHOOL

Comparison of Costs, Equipment and Supplies. In the junior high school field, woodshop led all the other shops in cost of equipment. It was followed closely by graphic arts and general metal. Drafting, electricity and crafts followed in that order. As was the case in the high school field, the shop established among the first was one of the most costly. Machine shop and auto shop are not included in this study because they are not included in the junior high school program.

As for cost of supplies, woodshop and general metals shared first position. They were followed by crafts, and electricity, with graphic arts and drafting in that order. The trend seems to be about the same in the junior high school field, as in the high school program. The top three shops are the same relative to cost of equipment and supplies. This indicates that the same factors apply for the junior high
area as for the high school area. The cost factor of equipment and supplies have little bearing upon the establishment of the shops.

**HIGH SCHOOL**

**Order of Establishing Shops.** There seems to be a trend in the order of establishing shops in many schools of California. The results showed that when ranked from 1 through 9, woodshop had the highest total points, and ranked number one. Drafting ranked second, with auto shop third, to make the top three shops.

One reason that drafting is one of the first shops established in the program may be because the University of California now requires high school drafting for the field of engineering. The writer has noticed an increase in enrollment in the drafting classes of the school by which he is employed. The writer has noticed that a number of boys taking college preparatory courses that never take industrial arts subjects, now take drafting.

Machine shop ranked fourth. Some of the areas which ranked low, such as crafts and photography, are shops that are not expensive to establish or operate. Woodshop and machine shop, the two most costly to establish and operate are ranked high. This indicates that the cost factor has little to do with establishing
the industrial arts program. Woodshop may be established first because of tradition.

It is probably because wood and metal still play an important part in man's life, that these shops are established first. After all, electricity, crafts, and graphic arts are relatively new areas in the curriculum. As time passes on, they may become equals to woodshop and metal shop.

Regardless of the reasons, there is a definite trend in the order that shops are established.

Comparison of Costs, Equipment and Supplies. Comparing the costs of all nine areas of industrial arts, it has been found that machine shop costs more than any other area. Woodshop was second in cost; graphic arts third; general metal fourth; auto shop, electricity, drafting, photography, and crafts following in order. Graphic arts which is thought to be excessive in cost by some administrators, was third in cost. The cost factor therefore, could not be the sole reason for excluding graphic arts. There must be other reasons as well. Concerning the cost of supplies, woodshop is in first position. Graphic arts and machine shop are in second and third positions; auto shop is fourth, then crafts, general metal, electricity, drafting and photography in that order.

The cost of operating after establishment does not seem
to be a factor in having a shop included in the program.

Reasons Why Graphic Arts Is Excluded. According to answers given in the questionnaires, the main reason for exclusion of the graphic arts program is shortage of graphic arts teachers. Ten schools stated this was the reason why they did not have a graphic arts program. This reason was followed closely by no demand for the course, then pressures from outside organizations, excessive cost of equipment, and lastly was the production printing of school materials.

Therefore, it can be assumed that the cost of equipment and supplies has little bearing upon the exclusion of graphic arts from the program. Shortage of teachers is the big factor. This means that the colleges and universities in the State of California cannot or are not turning out enough teachers to meet the demand. Graphic arts is being hindered because of this one factor. When the supply catches up with the demand, graphic arts may be included in the curriculum more and more.

Objectives of Graphic Arts Program. The schools reported that they either had established or would establish the graphic arts program for the following objectives:
1. To carry out the objectives of industrial arts;
2. To acquaint the students with the various fields of industry, materials, products, and employment opportunities;
3. To teach graphic arts as a part of general education;
4. To offer an exploratory course in graphic arts;
5. To give some training along a vocational line;
6. To satisfy demands from the community; and
7. To do most of the school's printing.

It can be concluded that most graphic arts courses are established upon the objectives of industrial arts, and upon otherwise sound principles. Only five out of the forty schools established the program just to do the school's printing.

**Number of Students That Take Graphic Arts.** The questionnaires revealed that 1,564 students took beginning courses in graphic arts during the school year 1954-55, and 747 took advanced courses. These figures are from the forty schools that participated in the study. The schools reported that 93 students entered industry from the graphic arts program. Graphic arts programs can be set up to handle 25 students quite successfully, and many schools handle more than that number. This is a good indication that the enrollment of graphic arts is increasing even though there is a wide variance in
types of programs among the schools of California. Some stress printing and some stress graphic arts.

**Cost of Operation.** The cost of operating a graphic arts shop varies widely. Instructional supplies averaged around $450 annually. Capital outlay also averages around $450 annually. The maintenance cost averaged close to $320. School production averages over $500. These amounts were reached by totaling the figures on the questionnaires and dividing by the number of participating schools.

It can be assumed that the cost of operation is related to the philosophy of the program. A production shop that does most of the school's printing naturally costs more to operate than a shop that teaches graphic arts without production.

Twenty-three schools indicated that they did production work. Four did not handle production. Most of the schools did production for their own school. Nineteen schools did production for their school and the district. Twelve schools did production for more than one school.

Practically all graphic arts shops do some production. Production is still a problem with the teachers, but it is one that can be worked out so that production
will not be a burden on the shop. That is a problem that each teacher must face and work out for himself. A certain amount of production is beneficial to advanced students, because printing school forms that will actually be used provides real incentive for learning.

However, the study provides evidence that production work in the graphic arts shop is still a problem. Too much production does not leave enough time for the instructor to teach graphic arts subject matter; production work will continue to be a problem until a satisfactory method is worked out to control this work.

The study has proven that school production is one factor that causes the cost of graphic arts to become excessive. Production costs averaged $540 a year.

It is proven from the study that graphic arts is not excessive in cost of equipment and supplies in relation to other industrial arts areas. It is third in cost of equipment in high school and second in cost of equipment in junior high school; second in cost of supplies in high school and fifth in cost of supplies in junior high school.

The information gathered proves that operational costs of the graphic arts shop are not too high.
Instructional supplies and capital outlay for operation averaged $450 a year. Maintenance averaged $320 a year.

From the analysis of data, it can be concluded that one of the real reasons for the exclusion of the graphic arts program was a shortage of graphic arts teachers.

The following recommendations, as concluded from the results of this study can be made:

1. That graphic arts not be excluded from the industrial arts program because of excessive costs.

2. That some control be placed upon the amount of production work of the graphic arts shop.

3. That students who plan on becoming teachers be made acquainted with the graphic arts program and the possibilities of teaching the entire area.
BIBLIOGRAPHY


APPENDIX A

FORTY CALIFORNIA HIGH SCHOOLS
PARTICIPATING IN THE STUDY
## APPENDIX A

### FORTY SCHOOL DISTRICTS OR HIGH SCHOOLS THAT HAVE PARTICIPATED IN THIS STUDY

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<tr>
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APPENDIX B

LETTER AND QUESTIONNAIRE
SENT TO THE PARTICIPANTS
Dear Sir:

I am working on a research study that will be submitted as a requirement for the M.A. degree at Oregon State College.

The problem of this thesis is: When new industrial arts shops are established in a high school or junior high school program, graphic arts is many times excluded. Many reasons are given by the administration for the exclusion of this shop. Among them are excessive production, financial cost, the belief that not much learning comes about when the shop is overloaded with production and shortage of good graphic arts teachers.

It is the purpose of this study to find out the exact reason for the exclusion of graphic arts since as a subject of industrial arts, it is a part of general education.

I would appreciate having you fill in, in question 1, the order in which shops were established ten years ago. Were the shops during 1945-46 school year established in the same order as they are at the present time?

I would appreciate any comment that you would like to make.

Sincerely yours,

DeWeese W. Stevens
1. Please number in the order in which you establish new industrial arts shops in your system.

Senior High School
--- Woodshop
--- General Metal
--- Machine Shop
--- Drafting
--- Graphic Arts
--- Crafts
--- Auto Shop
--- Electricity
--- Photography

Junior High School
--- Woodshop
--- General Metal
--- Machine Shop
--- Drafting
--- Graphic Arts
--- Crafts
--- Electricity
--- Photography

2. Please fill in the amount of money spent for initial equipment and supplies in the following shops:
Please do not include salaries or building costs in your figures.

Senior High School
   Equipment*   Supplies**
--- Woodshop
--- General Metal
--- Machine Shop
--- Drafting
--- Graphic Arts
--- Crafts
--- Auto Shop

Junior High School
   Equipment*   Supplies**
--- Woodshop
--- General Metal
--- Machine Shop
--- Drafting
--- Graphic Arts
--- Crafts
--- Electricity
Electricity  Photography

Photography

*Equipment is defined as those items which are relatively permanent in the shop (desks, cabinets, tables, linotype, presses, lathes, power saws, drill presses, stereotype, milling machines, furnace, etc.).

**Supplies are defined as items that are consumed and replaced in the course of instruction (paper, ink, cleaners, paint, wood, steel, metal, leather, ton, etc.).

3. If the Graphic Arts area is not included in your program, please check those items in the below list that influence the exclusion of Graphic Arts from the program.

   a. Excessive cost of equipment and supplies.
   b. Graphic Arts does not educationally benefit a student as much as other areas of industrial arts.
   c. Outside pressures from union or printing organizations in the community.
   d. Shortage of graphic arts teachers.
   e. Fear that the graphic arts shop may go into production printing, leaving no time for teaching.
   f. No demand for the course.
   g. Other reasons: Please list ________________

4. Underline the following objectives that would apply in establishing a new graphic arts program in your system.

   a. To give some training along a vocational line.
   b. To carry out the objectives of industrial arts and graphic arts as listed by those of authority.
c. To offer a purely exploratory program.
d. To do most of the school printing.
e. To satisfy demand from the community.
f. To acquaint the students with the various fields of industry, materials, products, and employment opportunities.
g. Because it is a part of general education.
h. Because the school system can receive reimbursement from Federal funds.
i. Other

5. Please list the following answers on space provided.
a. How many students a year take graphic arts beginning courses? ___
b. How many students a year take advanced graphic arts courses? ___
c. How many students a year enter the printing industry from the graphic arts shop? ___

6. How much money does it cost per year to operate the graphic arts shop? Please list amount of money spent in the following areas. Please do not include salaries in your figures.
a. ________ Instructional supplies.
b. ________ Capital outlay.
c. ________ Maintenance for shop.
d. ________ School printing or production.

7. Is any school production done in your graphic arts shop?
   Yes ________ No ________
8. If answer is yes, how much production is done?
Please check the following:

____ Production for school only.
____ Production for district only.
____ Production for more than one school.
____ Production for schools outside the district, such as elementary and junior high schools.
____ Other. Explain.