DOCUMENT RESUME

ED 233 924 SO 014 789

TITLE Saving Money on Printing and Reproduction. ERIC Fact Sheet No. 2.

INSTITUTION ERIC Clearinghouse for Social Studies/Social Science Education, Boulder, Colo.

PUB DATE Apr 81

NOTE 4p.

PUB TYPE Guides - Non-Classroom Use (055) -- Information Analyses - ERIC Information Analysis Products (071)

EDRS PRICE MF01/PC01 Plus Postage.

DESCRIPTORS Comparative Analysis; Copyrights; *Cost Effectiveness; Cost Estimates; Photocomposition; *Printing; *Production Techniques; *Reprography; Unit Costs

IDENTIFIERS Fact Sheets; *Offset Duplication; Printing Presses

ABSTRACT

Presented in question-and-answer format, the fact sheet provides educators with general information on photocopying and offset printing processes and offers specific tips for saving money on printing and reproduction. The first section addresses the use of photocopying, describes instances when photocopying is most economic, and discusses limitations and disadvantages of the photocopying process. General guidelines for photocopying are offered, with attention given to planning the finished product, obtaining samples before proceeding, and attending to copyright laws. The second section of the paper addresses the cost-effectiveness and techniques used in offset printing. A description of two basic types of offset presses (web-fed and sheet-fed) is followed by an explanation of the jobs for which each press is best suited. Suggestions for choosing a good printer, minimizing offset printing costs, and obtaining accurate cost estimates are also offered. Suggestions for reducing printing costs are based on the generalization that the per-unit cost of photocopying remains the same regardless of the number of copies printed, while the per-unit cost of offset printing goes down as the number of copies goes up. The importance of matching the job to the most appropriate equipment and then designing the job to make the most efficient use of that equipment is the central theme throughout the paper. (LH)

SAVING MONEY ON PRINTING AND REPRODUCTION

AN ERIC FACT SHEET NO. 2
Apr 81

ERIC Clearinghouse for Social Studies/Social Science Education
Boulder, Colorado

ERIC®
Clearinghouse for Social Studies/Social Science Education
855 Broadway
Boulder, Colorado 80302

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April 1981

Saving Money on Printing and Reproduction

Most educators find themselves, from time to time, faced with the need to coordinate a printing job. This can be as simple as putting out a one-page newsletter or as complex as planning and organizing a book or the printed program for a major professional meeting. However complex the task, it's safe to assume that the budget will be tight; getting the job done for the least amount of money is sure to be an important concern. Yet few people in education have had extensive experience with printing procedures. Often, a teacher or administrator who volunteers for the task (or is stuck with the job) of coordinating a printing project is not sure how to approach the assignment, let alone accomplish it with the minimum possible expenditure of financial resources.

This fact sheet contains general information and specific tips for saving money on printing and reproduction. It is not meant to be the last word — nor could it be, since every printing situation is unique in terms of the resources and equipment available and since printing technology is changing so rapidly. However, the two most important factors in minimizing printing costs — matching the job to the most appropriate equipment and then designing the job to make the most efficient use of that equipment — are likely to remain constant.

Two quite different kinds of reproduction processes — photocopying and offset printing — can produce a professional-looking product. Each process has advantages and limitations, and either one may be the more economical for a given job. However, there is an important difference between the two kinds of processes in terms of calculating costs. The cost of photocopying depends entirely on the total number of individual copies or impressions — thus, the per-unit cost of a photocopied product remains the same regardless of the number of copies printed. In offset printing, the unit cost goes down as the number of copies goes up. The point at which offset printing becomes cheaper than photocopying, on a per-unit basis, will vary according to the pricing schedules of individual printers and copy shops. As a rule, however, if more than 300-500 copies are to be printed, offset printing will be cheaper than photocopying.

Photocopying

Photocopying, technically known as xerography, is the simplest and quickest method of reproducing a small job, although it is not necessarily the cheapest method. Most educators have access to some type of photocopying machine. However, photocopiers vary a great deal in speed, sophistication, and impression quality. The most sophisticated new copiers can make two-sided and reduced copies in addition to collating them automatically — all at very high speed. The blackness of the impression can usually be precisely controlled, and some new copiers pick up so much detail that even a halftone (photograph) will reproduce at least recognizably if it contains enough contrast. However, the photocopiers found in most schools are not capable of doing such tricks; many are relatively primitive, and some require the use of a special paper that is not particularly pleasing to the eye or the touch.

Most communities of any size include at least one commercial establishment that offers good-quality "quick copy" services, which may include supplying covers and binding, folding, and/or stapling the finished copies. It's worth taking some time to investigate the prices, services, and reproduction quality offered by local copy shops.

When is photocopying the best method of reproduction? Photocopying is often the most economical way of reproducing a job that consists of one or more unbound letter-size (8½" by 11") or legal-size (8½" by 14") sheets printed on one or both sides. For bound volumes with letter-size pages — reports, directories, technical manuals, or handbooks — photocopying may be the cheapest printing method for relatively short "runs." (The term *run* refers to the number of copies printed at one time; the adjective *long* or *short* refers to the amount of time required to print the job — thus, a "short run" means that relatively few copies are to be printed.) Photocopying may be an economical method of printing a larger number of copies if they are to be distributed gradually over a long period of time and it is not certain how many copies will eventually be required, since copies can be run off in small amounts as needed.

What are the limitations and disadvantages of photocopying? One limitation is page size: photocopying is feasible only when the finished product is to consist of letter-size or legal-size sheets. Some methods of binding cannot be used with photocopied books, since the pages emerge as single individual sheets. Although the paper used can be almost any color, the "ink" color is limited to black. (Although there are copiers that make color reproductions, the process is very costly and time consuming, and the end result is likely to resemble very early color television.) Probably the most constricting limitation has to do with art and illustrations: photographs and shaded drawings will not reproduce well, nor will areas of solid black or gray.

Great care must be taken in preparing the original, or master, sheets that are to be copied. Cutting and pasting should be avoided, since cut edges may produce shadows or black lines on the copies. The original material to be copied should be printed or typed sharply and clearly in black, on white paper; some ink colors do not reproduce at all, and others reproduce poorly. A margin of at least one-half inch must be left on all sides of the original page because that area cannot be "seen" by the copier.

What are some general guidelines for photocopying?

— Think about what you want the finished job to look like. Can it be effectively reproduced by photocopying, given the limitations of that method of reproduction? If your original design plan is not suitable for photocopying, can it be changed or adapted to fit the restrictions of xerography?

— Get a sample impression from the photocopier you plan to use, working from an original page of your job. Is the quality satisfactory? Do you need a more sophisticated photocopier or a sharper master copy? If the most accessible copier does not yield satisfactory impressions, explore the possibility of using a local "quick copy" shop.

— Make sure that the material to be copied is not protected by the copyright law, or that you have appropriate permission to reproduce the material. (For a booklet describing the "fair use" and photocopying provisions of the current copyright

law, request Circular R21, *Reproduction of Copyrighted Works by Educators and Librarians*, from the Copyright Office, Library of Congress, Washington, DC 20559.)

Offset Printing

Offset presses vary a great deal in size, type, and specific technology. What they all have in common — and what distinguishes offset printing from the direct reproduction of a positive master, the technique used in xerography — is that before the actual printing process can take place the printer must essentially take a photograph of the material to be reproduced. The resulting negative, or plate, is used to make an inked impression on a rubber-covered cylinder, which in turn transfers the impression onto the paper.

The initial steps required to prepare the negatives account for a major part of the cost of offset printing. Setting up the press is another significant cost factor. These costs remain the same for a particular job regardless of how many copies are printed; only the costs of ink, paper, and press time increase with the length of the press run. Thus, in offset printing, the per-unit cost of producing a finished copy goes down as the press run goes up.

In addition to the number and size of the pages and the number of copies to be printed, other factors influence the cost of a printing job. In the simplest (and cheapest) kind of offset reproduction, type and/or line drawings are printed in one color ink (usually, but not necessarily, black) on one color paper (usually, but not necessarily, white). If the material contains photographs or shaded drawings (halftones), additional charges will be made on the basis of the number and sizes of the halftones and whether they "bleed" (extend to the edges of the page) or are confined within the type margins. The cost of paper varies according to the weight, texture, and finish; coated (slick) paper is more expensive than uncoated paper.

Finally, the use of additional ink colors can double, triple or quadruple the cost of a printing job. The reproduction of full-color photography, the most expensive kind of printing, is done by what is known as the *four-color process*. The technical preparation of full-color illustrations prior to printing is an exacting and expensive procedure, and each additional color usually means a separate press run along with extra time for cleaning out and preparing the press.

How do offset presses vary? There are two basic types of offset presses: *web-fed* and *sheet-fed*. A web-fed press prints on a continuous roll of paper which is automatically cut apart at the end of the printing process. (Anyone who has made a field trip to a daily newspaper has probably observed a web press in action.) A sheet-fed press prints on sheets of paper which have been precut to a size that fits the press — which may be many times larger than the size of the finished page.

Both sheet-fed and web-fed presses come in a wide variety of sizes; however, the very largest presses are web-fed. The size of the press determines the size of the cylinders or sheets of paper that can be used on the press.

Which kind of press is best for which kind of job? In general, the bigger the job, the bigger the press that can handle it most efficiently. If you want to print a lot of copies of a 200-page book, a big web press is probably the choice for the job. Conversely, the low bid for printing *Keeping Up* — a four-page newsletter printed on a single sheet of 11" by 17" paper — came from a printer with an 11" by 17" sheet-fed press. (The cost of printing both sides and folding the newsletter is about 5 cents a copy.)

Not every community boasts a printer with a big web press and full binding facilities. If you are printing a good-size book, you may get the best price and service from an out-of-town printer.

How does one go about choosing a printer? "Shopping" for printing bids can be a time-consuming process. Ideally, only three or four printers should be asked to bid on a job. But if the Yellow Pages list a dozen or more printers, which ones do you ask? Sometimes their advertisements provide clues to the specific kinds of jobs that various printers can do most competitively. However, the best way to identify which printers to ask for bids is to consult people who deal with printers and printing services on a day-to-day basis — typesetters, graphic designers, or publications coordinators of organizations that use a variety of printing services. It's not necessary to be a personal friend of such a "consultant." Simply introduce yourself, briefly describe the job, and ask for recommendations. Most people who deal regularly with printers will be happy to tell you which ones are likely to offer reasonable prices and good service for a particular kind of job. You may also get some valuable tips on which printers to avoid at all costs.

How can the job be designed most economically? When you begin to plan a printing job, allow some flexibility in the physical format. For example, don't arbitrarily decide on a finished page size until you have selected a printer. Printing a job economically depends in large part on using paper efficiently. Printers buy paper in huge sheets or rolls that come in various sizes. The particular type of press determines the bulk sheet size or roll width, which in turn determines the most economical finished page size. If the printer you choose can get 16 pages measuring 5¾" by 8¾" out of a bulk sheet, don't hold out for a 6" by 9" page.

The total number of pages in a finished book is another important consideration. In offset printing, instead of being printed one at a time, many pages are printed on a single sheet in groups called *signatures*. A very large web-fed press may accommodate signatures of up to 64 pages; however, all signatures consist of multiples of four. Because it costs almost as much to print a partial signature as a full one, for maximum economy the total number of pages in a printed document should equal, or be a multiple of, the number of pages in a full signature. For example, if a particular press accommodates a 16-page signature, the most economical number of pages would be 16, 32, 64, or some other multiple of 16. In any case, it is important to keep in mind that the total number of pages in a bound volume printed on an offset press must always be a multiple of four. That is, if you end up with 14 pages of copy for a booklet, there is no alternative to having two blank pages (one blank sheet) in it somewhere.

When you approach printers to ask for bids, don't be shy about asking for cost-saving suggestions about format. Any printer worth doing business with will be happy to help you make economical decisions about size and number of pages, type of paper, and binding.

What information does a printer need to have in order to provide an estimate of costs? When you shop for printing bids, you will need to give the printer certain kinds of basic information about the job. (It is also a good idea to let the printer take a look at the job, if it is at all complicated.) Make sure you give exactly the same details to all the printers you talk to, and that all of them are submitting bids on the basis of the same assumptions (for example, that the paper used will be 60-lb. white offset). To bid on a straightforward one-color job, a printer will need the following information:

— Number of copies to be printed.
— Page size of finished product.
— Number of pages in finished product.
— Number and sizes of halftone illustrations, if any, and whether these "bleed" or are confined within the type margins.
— Weight, type, and color of paper to be used.
— Color of ink to be used.
— Specifications for cover, if any.
— Method of binding to be used.
— Length of time the negatives (plates) should be saved for possible reprinting.
— Date and place of delivery of finished products.

Finally, don't be afraid to ask "dumb" questions when making decisions about printing. You can learn a lot by asking questions of a printer. And a printer who is willing to give you some personal attention and suggestions for doing a job economically can be your best friend when you're trying to save money on printing and reproduction.