

1980

A Comparison of production printing services among the fifteen Area Education Agencies of Iowa

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A Comparison of production printing services among the fifteen Area Education Agencies of Iowa

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Abstract

The purpose of this study was to discover if there were any differences among the Area Education Agencies of Iowa in printing production services. This was done by means of a questionnaire based on the amount and type of printing equipment owned and used by the AEAs, the number of personnel and the Full-Time Employee (FTE) hours of the staff, and the total number of offset printing impressions produced during the fiscal year from July 1, 1978 - June 30, 1979. The questionnaire was sent to all fifteen AEA Media Center directors in the spring of 1980, asking them to fill out the survey and return it in a prepaid, pre-addressed envelope. There was 100% response to the survey from the AEAs. The findings of the study show that there are definite differences in the areas of printing that were examined, and that all of the hypotheses of the study were accepted. The conclusion stated that although there were differences in equipment, personnel, and impressions, the study could not be used as a measure of productivity since it did not analyze all the factors involved in that question. The individuality of the AEAs was evident in printing production services, and would also be equally apparent in a comparison of the other operations of the centers.

A COMPARISON OF PRODUCTION PRINTING
SERVICES AMONG THE FIFTEEN AREA
EDUCATION AGENCIES OF IOWA

A Research Paper
Presented to the
Faculty of the Library Science Department

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

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July 21, 1980

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Date July 23, 1980

ABSTRACT

The purpose of this study was to discover if there were any differences among the Area Education Agencies of Iowa in printing production services. This was done by means of a questionnaire based on the amount and type of printing equipment owned and used by the AEA's, the number of personnel and the Full-Time Employee (FTE) hours of the staff, and the total number of offset printing impressions produced during the fiscal year from July 1, 1978 - June 30, 1979. The questionnaire was sent to all fifteen AEA Media Center directors in the spring of 1980, asking them to fill out the survey and return it in a prepaid, pre-addressed envelope. There was 100% response to the survey from the AEA's. The findings of the study show that there are definite differences in the areas of printing that were examined, and that all of the hypotheses of the study were accepted. The conclusion stated that although there were differences in equipment, personnel, and impressions, the study could not be used as a measure of productivity since it did not analyze all the factors involved in that question. The individuality of the AEA's was evident in printing production services, and would also be equally apparent in a comparison of the other operations of the centers.

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Chapter 1

INTRODUCTION

In July of 1966, federal funding for the development of school library resources became available to the states from Title II of the Elementary and Secondary Education Act (ESEA). Iowa was unique in that it chose to distribute these funds to sixteen sub-agencies rather than apportioning the money directly to the school systems.¹ Each of these sub-agencies included an Instructional Materials Center from which print and non-print collections, consultative services, and production services could be provided by qualified professional personnel to all schools in a regional geographic location.

Allocations for the initial years illustrate the fact that each center would develop in individual directions, since the amount of Title II money given to each center was based on pupil enrollment, relative need, and the assessed wealth per pupil in schools of the area.² This points out the financial diversification among the various centers, with allocations ranging from \$20,000.00 to \$223,470.82.³

In 1975 the Iowa state legislature enacted mandatory legislation (Chap. 273) that created a network of fifteen Area Education Agencies (AEA) effective July 1 of that year. The former sixteen regional centers

¹Paul Spurlock, "ESEA is on the Move in Iowa," Iowa Educational Bulletin, (May, 1968) p. 5.

²Iowa. Department of Public Instruction, ESEA Title II Allocations (Des Moines, 1970).

³Spurlock, p. 5.

were reorganized into fifteen area centers, with specific duties and responsibilities required by the law.⁴ This legislation was intended to provide an outline and model for the growth and development of the AEA's. Even with these guidelines there was a certain amount of flexibility to allow for individual growth and needs of each AEA. For this reason the AEA's of Iowa are similar, yet unique. Each AEA provides at least minimum services specified by law, although they may exceed those standards if desired.

According to the law, the AEA's must have the capability to provide basic production services such as slide photography, drymounting and lamination, transparency production, and offset press services.⁵ The AEA's must also provide, or contract to provide, reproduction services and other more sophisticated media services such as TV production, photographic services, and graphic and print services.⁶ The law further states that the AEA's must provide support staff, professional personnel, materials and equipment, and the physical facilities needed to operate.⁷

PROBLEM STATEMENT

The purpose of this study was to survey the printing production services offered by the fifteen AEA's. The specific problem examined was: are there differences among the fifteen AEA's in production printing services based on the amount and type of equipment they possess,

⁴Iowa. Department of Public Instruction, Rules for Area Education Agency Media Centers, (Des Moines, 1975) pp. 1-8.

⁵Ibid., p. 4. ⁶Ibid. ⁷Ibid., p. 5.

the number of personnel employed for those services, and the total number of offset printing impressions produced over one year's time?

HYPOTHESES

The hypotheses tested in this study are as follows:

1. There will be differences among the AEA's in the variety of machines owned and utilized in printing production including offset presses, collators, binders, cutters, typesetters, and other related equipment.
2. There will be differences among the AEA's in the number of each type of equipment owned and utilized in production printing.
3. There will be differences among the AEA's in the number of personnel in Full Time Equivalent (FTE) involved in production printing services.
4. There will be differences among the AEA's in the job titles and responsibilities of the printing personnel.
5. There will be differences among the AEA's in the total number of offset press impressions produced during the fiscal year 1979.
6. There will be differences among the AEA's in the number of offset press impressions per personnel FTE.

IMPORTANCE OF THE STUDY

Little research has been done on the subject of Iowa's Area Education Agencies. The recent reorganization of the media section of the Department of Public Instruction (DPI) has postponed the completion of the Media Center Program Evaluation Document for Iowa Area Education Agencies. As a result, there has been no comprehensive evaluation of

all the services provided by these Agencies, and no complete record of the printing production services which the media centers offer. This study will point out some of the differences in the printing services available from the various AEA's. Further expansion of research to include evaluations of all services offered by the AEA media centers has been recommended.

One of the functions of the AEA's is to provide services that the local schools cannot do themselves. In many cases, especially in the smaller districts, the cost of operation and maintenance of an offset press and other various printing equipment is beyond their means. For this reason printing services are among the most requested services of the AEA's.

ASSUMPTIONS

Basic assumptions for this study are:

1. That all fifteen AEA's meet the minimum standard requirements for printing production services including equipment and personnel as specified by law.
2. That all AEA's incorporate record keeping procedures for the total number of offset press impressions produced in a fiscal year.
3. That among the AEA's there will be different organizational and administrative structures in printing production services.

DEFINITIONS

Definitions for this study are as follows:

1. Area Education Agencies (AEA) and their Media Centers (AEAMC) may also be referred to as Agencies, Instructional Materials Centers (IMC), Educational Resource Centers (ERC), and Educational Materials Centers (EMC).
2. Services from an AEAMC shall mean services available to the school districts at no additional charge unless otherwise specified in the rules.⁸
3. Equipment shall mean all production equipment utilized in the preparation of printed materials.
4. Impressions shall mean the number of copies produced by the offset press.
5. Total impressions shall mean the total number of impressions of all the offset presses in a production printing service.
6. Printing shall mean the use of type, blocks, plates, etc., and ink or dye to stamp (words, pictures, designs, etc.) on paper.⁹
7. Offset printing shall mean a process in which the inked impression is first made on a rubber roller and then on paper, instead of directly on the paper.¹⁰

⁸Rules for Area Education Agency Media Centers, p. 4.

⁹G. & C. Merriam Company, Websters Third International Dictionary (Chicago: G. & C. Merriam Company, 1966) p. 1803

¹⁰Ibid., p. 1567.

LIMITATIONS

This study dealt only with printing production equipment, personnel, and offset press impressions of the AEA's. Respondents were asked to record only the type and number of each piece of equipment, and not the makes and models of equipment or the production capabilities of each piece. Because the two latter factors have some effect on the amount of personnel time and the total number of impressions produced, all results should be considered approximate.

Personnel information included the number of employees in the printing operation, their job titles and major responsibilities, whether they are full-time or part-time, and the approximate time each spent in printing services. No questions about the educational background or wages of personnel were asked. A Full Time Equivalent (FTE) rate was figured for personnel in each center. For example, one full-time employee and one half-time employee equalled 1.5 FTE. This rate was used in a comparison of AEA's by the total number of impressions produced.

The number of impressions was limited to the fiscal year 1979; beginning July 1, 1978 and ending June 30, 1979. This was the latest complete year for which information was available. A yearly figure was selected in order to represent equally both high and low production periods. For example, some AEA's do not print their own materials in the summer. To exclude a certain season might have unfairly affected the results.

Since it was doubtful that any centers measure the quantity of such work as sorting, binding, and cutting, the total number of printing

impressions from the offset press was used as the figure for production output. However, the FTE obviously included time spent in other printing production jobs besides the operation of the offset press. As a result, the impression output and the FTE ratio is only an approximation of a production rate. It is not intended to represent production efficiency.

Chapter 2

LITERATURE REVIEW

This review of literature is limited, since the amount of material available concerning AEAMC's and offset printing production services is minimal. Research on the subject of production services for these fifteen centers is non-existent. There is no comprehensive survey that lists the various services and capabilities of all the area centers.

The DPI evaluation of the AEAMC's would have possibly filled in many of the knowledge gaps on this subject, but it has not yet been completed. The evaluation's goals are to ascertain the strengths and weaknesses of individual centers to serve as an internal AEAMC evaluation document in the cycle of needs assessment, program planning, implementation, and evaluation, and to serve as a guide for the DPI in determining if the laws governing the formation and continuation of the AEAMC's are being followed.¹

The document is composed of nine major rating sections, including a brief unit for production services. This five page unit is a general rating of the services and quality of AEAMC production. The services mentioned refer to consultation of staff, presence of a specialist, contracted services, variety of clients, and distribution of materials in a district. The portion about quality concerned the

¹Iowa. Department of Public Instruction, Media Center Program Evaluation Document for Iowa Area Education Agencies (Des Moines, 1978) p. vii.

number of formats, technical quality, and turn-around time.² For the purpose of identifying specific processes and skills this questionnaire was not of great usefulness to this survey, although it provided much beneficial information concerning AEAMC's and other research projects.

The most useful study identified about the origins of the area centers was the 1968-69 Report of a Study of the Operations and Costs of the Instructional Materials Centers in Iowa, compiled by the Educational Media Division of DPI.³ That study used a questionnaire concerned with the categories of area data, facilities, circulation, processing and cataloging, personnel, expenditures, and receipts.⁴ That study also pointed out the various capabilities of each center by giving a list of production equipment. Few of the area centers possessed more than essential production equipment and services at the time. Among the equipment listed were thermo-fax machines, cameras and darkroom facilities, drymount presses, and offset presses. A majority of the centers did not have offset printing services in 1968, and their professional staff was often limited to a librarian and a director who was also in charge of audiovisual services rather than a separate technician or professional specialist.

The DPI study has limited application to this study because it is now somewhat dated. However, it did reflect the idea that production services, including printing, were a luxury in the area centers. By

²Media Center Program Evaluation Document for Iowa Area Education Agencies. p. VI-3.

³Iowa. Department of Public Instruction, 1968-69 Report of a Study of the Operations and Costs of the Instructional Materials Centers in Iowa (Des Moines, 1969).

⁴Ibid. pp. 1-9 to 1-11.

comparing the DPI report with current standards, the increase in sophistication of media technology is readily apparent. Much of today's equipment had not been invented or developed in practical form for educational use in 1969.

Another 1969 study, A Pilot Evaluation of Iowa's ESEA Title II Program,⁵ was a survey of services provided by selected area centers for that year. Most of the study reported on information from two questionnaires given to local administrators and teachers who evaluated the selected centers on services and materials. A few tables in this report included information pertaining to production facilities and services,⁶ although there was nothing applicable to this study. Respondents seemed to indicate a favorable impression of the services they were receiving, including in one case offset printing. The remainder of the study served only as further background material.

Probably the most comprehensive research about the regional materials centers in Iowa was done by Beverly Hinders Trost in a Master's thesis entitled Iowa's Plan for ESEA Title II, 1965-72.⁷ This report explained the history of the regional centers from their inception in 1965 to the year 1972 when the study was written. It provided an excellent background on the development of the centers with examples of primary documents, interviews, and legislation. Trost conducted a comparison survey of selected services and personnel for the years between

⁵Iowa Department of Public Instruction, A Pilot Evaluation of Iowa's ESEA Title II Program (Des Moines, 1969).

⁶Ibid., p. 67.

⁷Beverly Hinders Trost, Iowa's Plan for ESEA Title II, 1965-1972, U.S., Educational Resources Information Center, ERIC Document ED 077 199, 1972.

1965 and 1972 to show the growth of the individual centers. This survey was especially helpful for financial information, population, and related topics that have an influence on production services such as number of personnel and job titles. Beyond that however, there was no specific information about printing production.

The Trost study was limited to the years 1965-1972. Since 1972 there has been no other comprehensive research study about the area centers to bring this data up to date. The reorganization of the regional centers in 1975 and the additional growth and development of production services have not been incorporated into any comprehensive study.

Another competent background source for the regional center concept in Iowa was the 1975 study by E. Robert Stephens entitled Regional Educational Service Agencies.⁸ Stephens discussed regional services on a nation-wide basis, giving the data available for states that have regional educational agencies. While the paper gives a good background for comparing Iowa to other states with regional service agencies, there is no specific information about the individual Iowa centers, and no mention of any services in particular. For this reason the report had minimal value for this study of production printing services.

One of the best sources of general information on the beginning of area centers was an unpublished catalog produced by Area 9 in

⁸E. Robert Stephens, Regional Educational Service Agencies (Arlington, Va.: Educational Research Service, 1975).

Davenport.⁹ This resource contained numerous articles that described the establishment and development of the regional centers from 1965-1970, and was invaluable as a source for historical material and perspectives on this subject.

One article from this catalog was titled ESEA Title II is on the Move in Iowa,¹⁰ written by Paul Spurlock, Chief of the Educational Media Section of DPI. This article gave a synopsis of the creation of the Iowa regional centers along with explanations and a table of money allocations for the years between 1966-1968.¹¹ Another article found in the catalog was titled Iowa Media Centers, written by Dick Doak, which gave further related information on the history and growth of the regional media centers and their services.¹²

While the articles and the catalog provide excellent background material on the regional centers, they do not specifically mention printing services and very little about production as a whole. This is not really surprising since there were few centers that offered more than basic production services in the beginning of operation.

One of the more current guidelines for AEA services is the 1976 Plan for Progress...in the Media Center: District and AEA.¹³ It contains guidelines, examples, models, and evaluation forms for the

⁹ Information Catalog for Area 9 Instructional Materials Center, Davenport, Ia., 1970.

¹⁰ Spurlock, p. 4. ¹¹ Spurlock, p. 5.

¹² Dick Doak, "Iowa Media Centers," Educational Screen and Audiovisual Guide, (February, 1970).

¹³ Iowa. Department of Public Instruction, Plan for Progress... in the Media Center: District and AEA. (Des Moines, 1976).

media services that should be available in an AEA. Several services were outlined for the production area including audio, graphic, photography, video, and printing. Two topics were mentioned--duplication of copy-ready or center-prepared materials by offset or other printing methods, and related services including collation and binding.¹⁴

The best source of information on AEA production came from the document Rules for Area Education Agency Media Centers,¹⁵ published in 1975 by DPI for the reorganization of the regional centers into AEA's. This handbook is a collection of the rules and regulations that pertain to AEAMC operation and services. Among those rules that effect this study are:

1.5(4) a. Each AEAMC shall have the capability to provide basic media-oriented materials production services, including but not limited to: dry-mounting and laminating; slide photography; transparency production (in both thermal and diazo methods); audio tape duplication; enlarging or reducing teacher materials; offset press services. These services shall not be contracted and shall be provided at the actual cost of the materials used.

1.5(4) b. Each AEAMC shall provide, contract, or subcontract to provide quality and quantity reproduction services and other more sophisticated media services including but not limited to: microfilming services; photography services; TV production and cable programming; motion picture production; video tape duplication; graphic and print services; maintenance of media hardware. The AEAMC may charge actual costs incurred in providing these services.¹⁶

1.5(5) d. The number and kind of supporting staff members shall be determined by the extent of the approved programs and services provided by the AEAMC. Support staff in each AEAMC may include, but not be limited to: clerical personnel, technicians, aides, delivery and custodial personnel, working under the direction of a professional staff member.

¹⁴Plan for Progress...in the Media Center: District and AEA. p.21

¹⁵Rules for Area Education Agency Media Centers, pp. 1-8.

¹⁶Ibid., p. 4.

1.5(5) e. In addition each AEA shall provide the professional staff needed for services which are not mandated but are included in its approved media services program.¹⁷

1.5(6) Provide physical facilities. The physical facilities for each AEAMC may vary depending on the needs of that area. Each shall include space for: the materials lending library; professional library and curriculum library; a production area which will allow school personnel as well as staff to use selected equipment; office and work areas for staff; preview areas; storage space; and circulation and distribution area.¹⁸

1.5(7) Purchase other materials and equipment necessary for the continued development of its materials lending library; professional library; curriculum library, and production services. In addition each AEA shall purchase the necessary equipment and materials for services that are not mandated but are included in its approved program.¹⁹

In the review of literature for this study, two other subjects were researched in order to gain insight for solutions to the proposed hypotheses. The first of these was the topic of offset printing. On the topic of production, offset printing was the obvious choice for indepth consideration since it is the most widely used printing format among the AEA's. A search for the subject was conducted to uncover examples of evaluation criteria for printing. Unfortunately no evaluation criteria were found.

However, review of material on offset printing did supply further background information which was valuable to the overall proposal.

The results of reviewing this topic were of great aid in the clarification and explanation of the printing processes, especially in the definition of technical terms.

¹⁷Ibid., p. 5. ¹⁸Ibid. ¹⁹Ibid.

The two most beneficial books on offset printing were Operating the Sheet-fed Offset Press,²⁰ by Lane Olinghouse, and Graphic Arts Procedures: The Offset Processes,²¹ by Karch and Buber. These works went into great detail about the printing process, the physical characteristics of the machinery, and descriptions of production techniques used with the offset press.

Two other sources on offset printing were Advertising Production Planning and Copy Preparation for Offset Printing,²² by Henry Latimer, and Photo-offset Fundamentals,²³ by John Cogoli. Both contained information on printing techniques and preparation, yet were still of less value than the previously mentioned books on the subject.

The last area of information to be reviewed was evaluation procedures. Evaluations of production and printing were to be used as examples and models for the study questionnaire. Unfortunately no articles were found that gave specific evaluation suggestions for the two services.

The review of literature served to provide a basic background on the subject of the Area Education Agencies and printing production

²⁰Lane Olinghouse, Operating the Sheet-fed Offset Press (Philadelphia: North American Publishing Company, 1976).

²¹Robert R. Karch and E. J. Buber, Graphic Arts Procedures: The Offset Processes (Chicago: American Technical Society, 1967).

²²Henry C. Latimer, Advertising Production Planning and Copy Preparation for Offset Printing (New York: Art Directions Book Co., 1969).

²³John Cogoli, Photo-offset Fundamentals (Bloomington, Ill.: McKnight Publishing Company, 1973).

services. However, as mentioned before, the lack of specific information on these topics was expected. There has been no indepth study of production printing services provided by the AEA's. While the current survey is not comprehensive, it provides comparative information that has not been previously gathered.

Chapter 3

METHODOLOGY

Data for this survey were obtained through a questionnaire sent to the fifteen Area Education Agencies in Iowa. These questionnaires were sent to the AEAMC directors, who designated print or non-print specialists, supervisors and coordinators, or other personnel having major responsibility for printing services to respond to the survey.

In the spring of 1980 all fifteen AEAMC directors received the questionnaire. The designated respondents were asked to complete the survey and return it in a stamped, self-addressed envelope supplied to them. There was 100% response to the survey from the AEAMC's.

The questionnaire (see Appendix A) that was used for this survey was organized into three sections. The first part asked for information about the quantity and make or model of equipment used in printing services for each center. Equipment included offset presses, process cameras, sorters, binders, composer/typesetters, and all other related machinery used in preparation and printing. The second section requested information about the printing services personnel. This included the number of employees, the FTE for each person, the job titles designated for their positions, and a brief list of major job responsibilities. The third section was concerned with the printing output of each center based on the total number of offset press impressions over the 1978-1979 fiscal year. Questions were worded so that there was a minimum of inconvenience to the respondents when answering.

Chapter 4

ANALYSIS OF DATA

The tabulated information gathered through the survey of the fifteen AEA's in Iowa indicates that there are differences in the amount of equipment, the FTE number of employees, and the total offset press impressions produced by each center. For the most part the results were consistent with the anticipated answers. There were few surprising totals in the selected types of equipment, although some FTE numbers and impression totals were lower than expected.

EQUIPMENT

The first section of the survey was intended to discover what equipment each AEA has to work with in printing production. It covered items such as offset presses, binders, collators, typesetters, process cameras, and even paper joggers. Respondents were asked to give numerical totals for twenty types of equipment used in printing services, and to list any other equipment used for printing that the survey failed to include.

An optional question on the survey asked for the make and model of machinery. In the case of offset presses this information was probably more critical than for the other equipment. The original survey question only asked for the number of offset presses, but should have been expanded to differentiate between an offset press and a total copy system.

A total copy system such as the A.B.Dick 1600 or the A.M. 4250

is capable of performing the entire printing process from original to impression in one machine. The system chemically prepares a master, can reduce it in size, and runs it through the press. A regular press can only print a master prepared elsewhere. Some copy systems such as the A.M. 2650 may not have a master making attachment mounted directly with the offset press, but it is still considered a total copy system if the master maker is in close proximity.

In most cases a total copy system has a greater production capability than a regular offset press. By mechanizing the entire process, there is less need for employee time and training. An operator can be trained in less time because of fewer mechanical variables to control. Because of the probable production capability difference, the survey data were analyzed in order to separate total copy systems and offset presses.

Data displayed in Table 1 show that fourteen of the AEA's have some type of total copy system, ranging from A.B.Dick 1600's to a variety of Addressograph-Multilith (AM) models. AEA's 3,4,5,7,12, and 14 use A.B.Dick total copy systems, while all the others except AEA 6 possess an A.M. model system. AEA 6 does not have an offset total copy system, but uses a Xerox 9200 copier which has similar capabilities. AEA's 9 and 10 both possess more than one copy system, so the total for all centers is sixteen.

In addition to these systems there are twenty-one standard offset presses used in the AEA's. Again there was a fairly even mix between makes of machines. Those centers with A.B.Dick total copy systems tended to use the A.B.Dick 360 press or a similar model of that company. Those centers with A.M. systems usually had some model

Table 1

NUMBER OF PRINTING PRODUCTION EQUIPMENT BY TYPE OF EQUIPMENT

AREA	TOTAL	COPY SYSTEM	OFFSET PRESSES	SORTERS	COLLATORS	STAPLER/ STITCHER	PAPER CUTTER	PROCESS CAMERA	PMT PROCESSOR	STABILIZER	FOLDER	SHRINK WRAP	BOOKMAKER	COMPOSER TYPESETTER	OTHER TYPESETTER	SIGN PRESS	SPIRAL BINDER	THERMO BINDER	GLUE BINDER	PAPER JOGGER	PLATEMAKER	PAPER DRILL
1	1	1	1	0	1	1	1	1	1	0	1	1	0	0	0	1	1	1	0	1	1	1
2	1	1	1	0	1	2	1	1	1	1	1	1	0	1	0	1	1	0	1	1	1	1
3	1	1	1	1	1	2	1	1	1	0	1	0	0	0	1	1	1	0	1	1	1	1
4	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	2	1	0	1	1	1
5	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	1	1	0	0	2	1	1
6	0	2	0	1	1	1	1	1	1	1	1	0	0	1	0	0	1	1	1	2	1	1
7	1	1	1	1	1	1	1	1	1	1	2	0	0	0	1	1	1	0	0	1	1	1
9	2	2	1	1	3	2	1	1	1	0	1	1	0	1	1	1	2	1	1	4	1	1
10	2	2	1	1	1	3	1	1	1	1	1	1	0	1	0	0	1	0	0	3	1	1
11	1	3	0	2	2	1	1	1	1	1	2	0	0	0	1	0	2	0	0	0	1	1
12	1	1	0	1	1	2	1	1	1	1	2	1	0	1	1	0	1	1	1	1	1	1
13	1	1	1	1	1	2	0	0	0	1	1	0	0	1	0	0	1	0	0	1	1	1
14	1	1	1	0	1	1	1	1	1	1	1	0	0	0	0	1	1	0	1	1	1	1
15	1	2	0	1	1	1	1	1	1	0	1	0	1	0	1	1	1	0	1	1	1	1
16	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	1	2	1	0	1	1	1
TOTALS	16	21	9	17	22	13	14	14	14	10	18	6	2	8	6	10	19	6	7	21	15	15

of A.M. press such as the 1250W as their standard offset.

While offset presses are the major component of printing equipment, they are not the only type of machinery needed to operate a productive printing center. Before any impressions can be run on the press, an original master must be produced through graphic arts, photography, or other methods. After printing, there needs to be some system of organizing, finishing, and packaging the completed materials.

Among the equipment used in copy preparation for the offset press are cameras, typesetters, PMT processors, stabilizer processors, and exposure frame/plate makers. These tools are used in various methods, which are by no means the only way to accomplish copy preparation. The equipment listed is simply the most common to the AEA's.

A process camera uses photography to produce, enlarge, or reduce originals for the press. It is a highly versatile piece of machinery. The camera gives the print department all the vast capabilities used in still photography. All but one AEA uses either a horizontal or vertical floor standing camera, depending on the amount of space available in their darkrooms.

In using a negative photographic process, an exposure frame or plate maker must be used to convert the film negative into a positive image master for the press. All the AEA's have the capability. In some cases a master can be made directly from a positive image by using a master maker and converter. This process bypasses the negative film and eliminates a step in the production procedure. However, it can not be used with every project.

Two positive image processes frequently used by the AEA's are

PMT's and stabilization. PMT (photo-mechanical transfer) is the most popular method among the AEA's, as all but one center have a processor. Nine of the AEA's possess a stabilizer processor in addition to the PMT processors, and one AEA uses only a stabilizer process. The difference between processes is largely one of chemicals and procedure rather than results. Either of these processes is used to make a positive image of an original for the press.

One method of producing layout type and lettering is the composer/typesetter. This device often uses a keyboard and a chemical process to spell out copy in various type styles for a project. While this machine is more expensive than conventional typesetters, it has the advantage of speed. Eight AEA's use some type of composer/typesetter.

Other makes of typesetters work on roughly the same principle, with chemicals and circular fonts to spell out and photograph each letter of the desired type individually. The Vari-Typer is an example of this make of typesetter. Other methods of typesetting by photographing letters such as the Stripprinter are also used. Six of the AEA's possess some kind of typesetter other than or in addition to a composer. Six AEA's do not have any typesetting capabilities, and usually contract to have lettering produced. Once the lettering in the desired typestyle has been made, it can be placed on the original along with any photos or artwork desired.

After layout, paste-up, camera work, lettering, and master making, impressions can be run off on the offset press. Then come the finishing processes of sorting, collating, binding, cutting, folding, stapling, and wrapping. Not all of these operations are necessary on

every job, but they are usually available to accommodate specific requests.

Bin sorters are used mostly when connected directly to an offset press. As impressions are printed, they are automatically shuttled into separate bins or racks with one impression of a page to each bin. In this manner all of the pages for one copy of a project are placed in a bin as they come off the press. The result is a collection of different pages in each bin. Nine of the AEA's use bin sorters in their operation, although there are other ways to accomplish the same goal.

Another way to separate and organize printed impressions is collating. There are many different sizes and models of collating machines, but the purpose is still the same. Quantities of a single page are placed in a bin. A collator can have anywhere from ten to one hundred bins. A page is pulled from each bin, and a complete copy is compiled with pages in correct order. The result is the same as with a bin sorter, although the method of operation is different. All but one of the AEA's possess some type of collating machine for use in printing services.

After collating there is usually some method of straightening or jogging the gathered pages to achieve uniform edges. Some advanced collating machines do this automatically, but if this is not available a small jogging machine will be used to vibrate the pages into a uniform packet. Only one AEA does not have at least one of these jogging machines.

Many printing projects require some kind of binding. Probably the simplest and most economical is stapling material together. All

of the AEA's have at least one power stapler or stitching machine that is capable of fastening thick packets of material.

Other methods of binding include spiral binders, thermo-binders, and wax or glue binders. The most popular is the spiral binder, which uses a plastic strip attached to pages that are perforated on one edge. All the AEA's have at least one spiral binder. In contrast, only six AEA's possess thermo-binders, and only seven AEA's have a wax or glue binder. These two machines rely on heat treated materials or special padding substances to hold pages together in a packet or booklet.

Thirteen of the AEA's possess a power paper cutter that is capable of slicing almost a ream of paper at a time more accurately than can be done with manual paper cutters. Another piece of power equipment is the drill, which all AEA's have. These drills are valuable for putting holes through thick stacks of paper or booklets that can be placed in a ring notebook. All AEA's also use some type of folding machine that can be made to mass produce folded letters, announcements, and programs.

After cutting, collating, and binding material, six AEA's offer a service known as shrinkwrap. This material is a light plastic that shrinks when heated. By wrapping a packet or booklet of pages and then applying heat, a plastic seal is obtained around the material to help protect from damage in shipping or storage.

Two other pieces of equipment listed in the survey are not strictly printing equipment, but are often found in the print department. They could also require some job time from print employees. The sign press or poster printer is printing at the most basic level. Ink

is spread over block type letters, then a sheet of paper or cardstock is pressed on to them. The result is large lettered posters and signs. Ten AEA's offer the sign press as a service. Bookmaker/binders are found in two AEA's. This service usually involves rebinding or producing paperback and hardback books. This is not actually a printing service and is offered only as an extra benefit.

In addition to the equipment mentioned in the survey, a number of the AEA's possess other types of equipment that were not asked for. Appendix B is a list of additional pieces of equipment reported by the individual AEA's. One of the omissions from the survey was a mastermaker, a device usually found as part of a total copy system. Six AEA's listed these mastermakers as additional machinery. The other notable omission was some model of power punch. Three AEA's listed a type of electric punch such as a GBC model, and two AEA's possessed automatic punch machines.

Results of the survey show that the AEA's differ considerably in the type and amount of equipment used in printing production services. This difference can be attributed to various factors that are hard to measure. Among those variables are demand for services, administrative priorities, and budget allocations. Each AEA tries to provide the best possible service to a unique area of the state. It is natural, given the flexibility allowed by the legislature and the DPI, that different services and related equipment would be employed to accommodate demands.

Also, some AEA's may have chosen to contract for certain print services with a local company or another AEA rather than using equipment money and employee time. This practice is fully acceptable according

to the regulations, and often enables the schools in an AEA to receive services that otherwise could not be provided. Services such as camera work, metal masterplates, and typesetting are examples of possible contracted services.

PERSONNEL

The number (FTE) of personnel employed in the various AEA printing departments is left to the discretion of the administration in each of the AEA's. Data from Table 2 show that for the fifteen AEA's the number ranges from 2.0 to 9.0, with a mean average of 4.32 persons. Two-thirds of the AEA's fall below the mean average number of printing employees. A smaller range distribution had been expected. Obviously, certain centers put a higher per pupil expenditure priority on printing than the majority, and therefore are able to employ more personnel. However, the high end of the range was even greater than anticipated.

It is possible to break down the job titles of the AEA's into certain categories of identification. All AEA's have a designation for a printer or press operator. Seven AEA's employ someone specifically to act as a coordinator or supervisor of printing services. Other centers use certificated personnel in this role, but they are not counted as workers in the printing department. Seven centers also designate someone to provide graphic services for projects. Three AEA's use the title of technician for a print shop employee. Five centers use some type of production clerk, while four AEA's have a job calling for an assistant or aide to some printing specialty. There are also other job titles such as binders, type-

PERSONNEL EMPLOYED IN PRINTING PRODUCTION SERVICES BY FTE AND JOB TITLES

AEA	TOTAL NUMBER (FTE)	PERSONNEL - JOB TITLES WITH FTE
1	2.0	Offset Press Operator (1); Print Shop Media Clerk (1).
2	4.0	Offset Press Operator (1); Technician (1); Graphic Artist (1); Coordinator (1).
3	2.4	Production Technician Press Operators (2); Production Clerk (.4).
4	3.2	Production Supervisor (1); Technician (.8); Press Operator/Production Aid (1); Part-time Help (.4).
5	3.0	Head Printer (1); Copy Center Operator (1); General Clerk (1).
6	4.0	Press Operator (1); Graphics Technician (1); Media Clerk I (.5); Media Clerk I (.5); Media Clerk II (.5); AV Consultant (.5).
7	4.0	Production Specialist (1); Production Specialist (1); Production Generalist (1); Production Specialist (.5); Work Supervisor (.5).
9	7.0	Printing and Graphic Supervisor (1); Graphics Person (1); Printer I (1); Printer II (1); Printer III (3).
10	6.0	Lead Printer (1); Printer (2); Bindery Worker (1); Typesetter (1); Graphic Artist (1).
11	9.0	Coordinator (1); Press Operator (3); Copy Center Operator (1); Layout Assistant (2); Photo-typesetter (1); Binder (1).
12	3.0	Printer (1); Printers Assistant (1); Production Technician (1 not assigned to print, performs backup).
13	6.0	Composer/Layout Clerk (1); Press Operator (2); Printing Clerk (1); Printing/Graphics Production Coordinator (1); Supervisor/Information Processing (1).
14	2.2	Press Operator (1); Graphic Artist (1.2).
15	4.0	Press Operator (1); Assistant Press Operator (1); Graphics Trainee (1); Graphics Manager (1).
16	5.0	Production Supervisor (1); Production Aide/Typesetter (.5); Production Aide/Press Operator (2); Production Aide/Typesetter, Paste-up, AV (1); Production Aide/Billing, Typesetter (.5).

setters, copy center operators, and part time help.

While major responsibilities are similar, there are so many tasks required in printing production that it is possible for two people not to have the same job title, even if the job descriptions are similar. Each AEA adapts its personnel job titles and descriptions to meet specific needs of printing services offered by its center and locality. For example, a person who runs an offset press as a major job responsibility can be titled an offset press operator, a printer, a production specialist, a production technician, or a production aide, depending on which AEA is the employer.

Along with these different job titles are different responsibilities and job descriptions. AEA 1 has an offset press operator who runs the press, does some paste-up work, and prepares metal plates including negative development and stripping. AEA 9 has a printer to operate a A.M. 4250 MR total copy system with a 100 bin sorter; another printer who does composer-typesetting, darkroom, and some press work; a printer who runs an A.M. 1250 and 1250 L & W plus color work and darkroom tasks; a printer who runs a 2650 and the collators plus binding tasks; and another printer who does binding, cutting, stitching, punching, and some press work. The job descriptions vary to fit the needs of each AEA and the demands of the local area.

OFFSET IMPRESSIONS

Probably the most interesting, but misleading, question in the survey dealt with the number of offset impressions produced in the fiscal year, 1978-1979. The number of impressions provide some measure of productivity, but fails to account for the multitude of other print

related tasks performed by the staff. For this reason the number of impressions is only a partial representation of the production of a center.

Table 3 shows that from July 1, 1978 to June 30, 1979 the AEA's produced a total of 69,919,097 offset impressions. Individual totals range from 1,511,214 impressions to 10,627,072 impressions, and a mean average of 4,661,273. Six of the AEA's produced above the mean, and nine produced below the mean.

The impressions data were slightly different from that of the personnel data. An expectation was that the AEA's with the higher impression totals would also have the higher number of personnel (FTE). In one case this was not true. Arrowhead AEA 5 in Fort Dodge produced over six million impressions with an FTE of three persons. Since some of the AEA's estimated their impression totals, the combined totals and the mean average of impressions must be considered approximate. This does not change the overall results of the study.

Table 3 also shows some of the more interesting results of the survey. The average of impressions per FTE was tabulated, as well as the average number of impressions per offset press. The difference in where certain AEA's rank on the scale is often surprising. For example, AEA 14 ranks third in impressions per FTE, but ranks tenth in impressions per press. This difference is probably due to a low FTE of 2.2, which ranks fourteenth among the AEA's. The impression total of 3,289,000 ranks eleventh. With a low FTE the amount of impressions per FTE is fairly high. However, when the number of presses is used as a measure instead of FTE the situation changes. Since AEA 14 has two presses, which is the same as nine other AEA's, the ratio of

Table 3

NUMBER OF PRINTING IMPRESSIONS PER PERSONNEL FTE AND PRESSES

AEA	Personnel (FTE)	Number of Impressions	Number of Impressions per FTE	Number of Presses	Number of Impressions per Press
1	2.0	1,923,730	961,865	2	961,865
2	4.0	3,842,496	960,624	2	1,921,248
3	2.4	1,511,214	629,673	1.5*	1,077,476
4	3.2	2,800,000	875,000	2	1,400,000
5	3.0	6,481,234	2,160,411	2	3,240,617
6	4.0	3,912,713	978,178	2	1,956,357
7	4.0	5,000,000	1,250,000	2	2,500,000
9	7.0	10,627,072	1,518,153	4	2,656,768
10	6.0	6,243,566	1,040,594	4	1,560,892
11	9.0	8,830,000	981,111	4	2,297,500
12	3.0	3,537,192	1,179,064	2	1,768,596
13	6.0	6,021,080	1,003,513	2	3,010,540
14	2.2	3,289,000	1,495,000	2	1,644,500
15	4.0	2,400,000	600,000	3	800,000
16	5.0	3,500,000	700,000	2	1,750,000
Total	64.8	69,919,297		36.5	
Mean	4.3	4,661,273		2.4	

* one press was working only half of the year

impressions per press is lower on the scale. When compared to the other AEA's by a more equal measure such as presses, AEA 14's total ranks tenth instead of third.

Impressions per FTE is only a partial measure of productivity and must be weighed carefully with other information before being used as an accurate measure. FTE in this situation measures all the employees of the printing department. Impression totals show only what an offset press and an operator have produced.

Another example of differences involves AEA's 1 and 11. AEA 1 ranks fifteenth in FTE with 2.0, and fourteenth in the number of impressions produced. AEA 11 ranks first in FTE with 9.0 and second in number of impressions produced. In impressions per FTE they are quite similar, being ranked tenth and eighth respectively, with a numerical difference of about 20,000 in average number of impressions per FTE. On the surface they appear equal. However, if the average impressions per press is compared, AEA 1 ranks fourteenth while AEA 11 is fifth.

High FTE does not guarantee high impression per FTE average. If anything, it means just the opposite. In a system such as AEA 11 most of the printing jobs are specialized. At best only four of the nine people employed can be running a press at any one time. The others are employed at layout, graphics, darkroom, typesetting, and binding activities. At AEA 1 one person runs the press and does the other printing tasks. Because of the difference in the tasks of employees, the impression per press average is a more reliable measure of productivity, although it is not a complete measure.

Another example provides support for this statement. AEA's 2,

6, and 7 all have an FTE of 4.0 and two presses but the number of impressions produced is different in all three cases. The totals for number of impressions are similar with ranks of eighth, seventh, and sixth respectively. AEA 2 ranks eleventh in impressions per FTE, AEA 6 ranks ninth, and AEA 7 ranks fourth. In contrast, AEA 2 ranks seventh in impressions per press, AEA 6 ranks sixth, and AEA 7 ranks fourth. The range of "productivity" is smaller when dealing with the impressions per press average. If the variables of FTE and presses are the same, and the number of impressions produced rank closely together then it would seem likely that the averages of impressions per FTE and impressions per press should rank closely as well. Since the range of impressions per press rankings were closer than the range of impressions per FTE, then possibly the former is a more realistic measure of production.

However, there are other factors involved in the different totals of impressions produced. Table 1 shows that the AEA's 2, 6, and 7 have different equipment to work with in printing. Table 2 shows different job titles for personnel even though the FTE is the same. Perhaps the centers are geared to different types of services. If more time is spent in layout, darkroom, copy preparation, binding, and the other tasks of a printing department, then the number of impressions and the amount of time spent on the press could be affected. This would influence the impression averages per FTE to a certain degree.

It can be seen from Table 3 that there are many differences among the AEA's in FTE, the number of impressions, impressions per FTE, number of presses, and the number of impressions per press. The

ranking of AEA's for each area was different, although some AEA's were fairly consistent in their positions on the scale. In other examples the opposite was true. The ranking positions of some AEA's varied considerably.

Chapter 5

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to discover if there were differences among the fifteen AEA's of Iowa in production printing services. This was done by means of a questionnaire based on the amount and type of equipment the AEA's possess, the number of employees used in those services, and the total number of offset printing impressions produced over one year's time. These questionnaires were sent to the AEAMC directors in the spring of 1980. There was 100% response to the survey.

The results of the study were similar to expectations. There are definite differences among the AEA's in each area that were considered which can be readily seen by examining the tables of this report.

The first hypothesis stated that there would be differences in the variety of machines owned and used by the AEA's. Table 1 shows a wide range of equipment used in printing services, and that no two AEA's have exactly the same machinery to accomplish those tasks. There were also differences in the number of each type of equipment used by the AEA's. Totals for the number of machines possessed by the AEA's ranged from two to twenty-two, and were widely scattered within that range.

Another hypothesis stated that there would be differences in the number of personnel and the FTE for the AEA's. Table 2 shows that the number of persons employed was different and that the FTE ranged

from 2.0 to 9.0 with a mean average of 4.32 persons.

Data from Table 2 also show that there are differences in the job titles and responsibilities of printing personnel. This can most easily be seen in the example of offset press operator titles. Some operators are titled printers, offset press operators, production aides, production specialists, and production technicians. Responsibilities vary from strictly running a press to doing darkroom work, sorting, binding, and packaging materials in addition to operating a press.

One of the major differences among the AEA's is the total number of offset impressions produced during the time between July 1, 1978 and June 30, 1979. Table 3 indicates that totals of impressions range from 1,511,214 to 10,627,072 with an estimated average of 4,661,273. Another hypothesis about impressions stated that there would be differences in the impressions per FTE average among the AEA's. In Table 3 the range of averages was from 600,000 impressions per FTE person to 2,160,411.

A major problem of this study is the complexity of the operations of an AEA printing department. There are so many factors and variables concerning production printing that it seems tremendously difficult to make reliable conclusions and comparisons. An additional problem is that most of those variables defy measurement in a study such as this one. The only numerical total available to measure production in a printing department is offset impressions. After researching this topic, it was found that offset printing represents only a part of the overall production activities.

Many printing related tasks take a substantial amount of time and effort by the personnel of the print department. Measurement of

this effort was not included in the study. Related task time is much more evident in those centers with a higher FTE. These centers spend a greater amount of employee time providing additional services besides offset printing. In many cases this made the impressions per FTE totals look less favorable for certain AEA's in comparison to AEA's with a smaller FTE that concentrated mostly on printing.

Since the production of an AEA printing department depends on factors such as demand, equipment, type of jobs, budget, and administrative priorities, the impression totals can only portray an approximate example of productivity. The amount of work requested from an AEA depends on the local schools. If those schools have their own press, or chose to contract other companies for printing services, then an AEA could have less work. The production rate of a center would be effected if the equipment was not producing at capacity levels. However, this study did not examine that factor.

Another variable which has already been discussed is equipment. Table 1 shows a definite difference in equipment among the AEA's, and this must effect the type and amount of services available. The kind of job, whether it is printing, binding, darkroom, or any other will effect the amount of time spent by personnel on each task.

Perhaps the greatest factor effecting printing services is the AEAMC administration. An administration sets the priorities of the media center and allocates the amount of money spent on certain departments. A director can choose to emphasize video production rather than printing and supply more funding to that particular area. These priorities often reflect the needs of the local schools in the regional area served by the AEA.

Budget is directly related to administrative priority. The initial cost of operating a printing department must come from the AEA. However, by charging schools for services provided, a printing department can become self-sufficient. The AEA's differ in the prices they charge for materials and staff time in printing, but this information was not available through this study.

Pricing of materials and services can also relate directly to demand. The local schools will try to get the best service for the least amount of money. In certain printing tasks the local schools may be able to produce materials ^{at} as a comparable cost with the AEA. ✓

Because of these factors, there was not a truly reliable measure of productivity applied to this study. The impressions per FTE average was a misleading measure of production for reasons already mentioned. FTE includes more tasks than just printing, while impressions measure only the output of the presses. If any measure can be used at all it would be the impressions per press average. This average is more realistic since it relates only to press operation and production. But since this study does not take into account production capabilities of employees and machines, this measure must also be regarded as only approximate.

In spite of the problems of uncontrolled variables, the study did serve a positive purpose. For a given fiscal year, the AEA's can see where they rank in relation to each other in equipment, FTE, and number of impressions produced. Some comparisons can be made if various factors effecting the results are taken into account before drawing conclusions. This study was worthwhile and informative in a limited scope.

A number of recommendations could be made to extend this study or to gather additional information about printing production. One recommendation would be to account for the FTE time spent in tasks other than printing. This would help to give a better representation of printing production services. Each task could be "weighted" in terms of time and difficulty. The time or number totals for each project would show the amount of skill and labor devoted to it. For example, if offset printing rated a five, collating could be given a six since it takes slightly more time. A job requiring just printing and collating would then be given a total of eleven. This system could help each center identify exactly what type of projects were being handled, and where further service might be necessary.

Another study possibility would be a cost analysis of similar printing jobs between the local schools and an AEA. This project would need to account for labor, materials, time, and quality of production in order to give an accurate comparison. The result could show what type of projects are best suited to the schools, and which services the AEA's could offer at a lower cost. In this way the schools could be more cost efficient in producing printed materials.

A similar study could compare the cost of the same printing jobs done by all fifteen AEA's. This could indicate what centers charge to users and how long it takes to get a project completed. Factors to be measured would be much the same as a local school/AEA comparison; mainly labor, materials, time, and quality.

Through the comparison study of AEA printing services, the differences among the various centers has become more apparent. There are many other differences in the other types of services offered by

the AEA's to the local schools, and all are trying to meet the unique demands of a specific geographical region of the state. Variety in services is only one example of the demands that are met by the Iowa AEA's.

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PRINTING SERVICES AND EQUIPMENT

IOWA AREA EDUCATION AGENCIES

AEA Title _____

Location _____

1. In your printing department, what is the quantity of each type of equipment that your AEA possesses? Space has been provided if you wish to list makes and models of machinery, although this is strictly optional.

<u>Equipment</u>	<u>Number</u>	<u>Make or Model (optional)</u>
Offset Press	_____	_____
Bin Sorter	_____	_____
Collater	_____	_____
Power Stapler/Stitcher	_____	_____
Power Paper Cutter	_____	_____
Process Camera	_____	_____
PMT Processor	_____	_____
Stabilizer Processor	_____	_____
Folder	_____	_____
Shrink Wrap Machine	_____	_____

Equipment

Number

Make or Model (optional)

Bookmaker/Binder

Composer/Typesetter

Other Typesetter

Sign Press

Spiral Binder

Thermo Binder

Wax/Glue Binder

Paper Jogger

Plate Maker/Exposure Frame

Power Paper Drill

Other (please list by
usual name)

2. Please fill out the following chart for your printing employees. List job titles for each person employed in your printing services. Give the Full Time Equivalent (FTE) for each person based on the amount of time spent in printing services. Full time equals 1, half time equals .5, etc. Briefly list the major responsibilities for each individual as defined in their job description. Example:

<u>Offset press operator</u>	<u>1</u>	<u>Operate press, some darkroom work,</u> <u>occasional compset work</u>
------------------------------	----------	---

<u>JOB TITLE</u>	<u>FTE</u>	<u>MAJOR RESPONSIBILITIES</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

APPENDIX A

APPENDIX B

Other Items of Equipment Listed in Printing Services and Equipment Questionnaire:

-
- AEA 3: Offset mastermaker; Converter; Rapid-o-print developer
- AEA 4: Varifont headliner
- AEA 6: Xerox 9200
- AEA 9: Sorter feeder; Headliner; Envelope feeder; Tablematic numbering machine; (2) GBC electric punches; (2) Ibico kombos; GBC automatic punch; Velo punch; Velo binder; Paddy Wagon
- AEA 10: Xerox Royfax 115 copier; Mastermaker
- AEA 11: GBC automatic punch; GBC electric punch; 805AM Mastermaker; Padder; T-51 Colorhead
- AEA 12: GBC electric punch
- AEA 13: Mastermaker
- AEA 14: GBC Spiral Cutter
- AEA 15: 2000AM Mastermaker
- AEA 16: 805AM Mastermaker