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A post-secondary curriculum guide for teaching word processing with microcomputers

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A post-secondary curriculum guide for teaching word processing with microcomputers

Abstract

In an attempt to deal with the paperwork explosion occurring in business offices, administrative management has developed the concept of word processing as a means of increasing office efficiency. In business education departments of educational institutions "word processing" has become a confusing term. Too often it is use solely as a synonym for certain types of electronic equipment. According to Frank (10:22) it is the responsibility of educators to instill into the students the idea of a process and a procedure. Word processing is the application of it to the office. Modern technology has been applied to every other facet of business. Word Processing involves reexamining the entire chain of events from word origination to production of the finished document. It is a systematic method of converting ideas into written form.

A POST-SECONDARY CURRICULUM

GUIDE FOR TEACHING WORD PROCESSING

WITH MICROCOMPUTERS

———————

A Research Paper

Presented to

the Department of Educational Administration

and Counseling

University of Northern Iowa

——————

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts in Education

——————

by

Charles Bruce Houlton

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A Post-Secondary Curriculum
Guide for Teaching Word Processing
With Microcomputers

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Donald L. Hanson

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CHAPTER 1

INTRODUCTION

In an attempt to deal with the paperwork explosion occurring in business offices, administrative management has developed the concept of word processing as a means of increasing office efficiency. In business education departments of educational institutions "word processing" has become a confusing term. Too often it is use solely as a synonym for certain types of electronic equipment. According to Frank (10:22) it is the responsibility of educators to instill into the students the idea of a process and a procedure. Word processing is the application of it to the office. Modern technology has been applied to every other facet of business. Word Processing involves reexamining the entire chain of events from word origination to production of the finished document. It is a systematic method of converting ideas into written form.

This research was conducted to provide business educators information on this management tool and to identify concepts appropriate to a word processing curriculum. This research report includes information on the status of computer simulation in word processing instruction, word processing hardware comparisons on capabilities, word processing concepts included in the high school business education curriculum, and concepts appropriate for a post-secondary word processing curriculum.

Statement of the Problem

The office of today has changed dramatically due to the influx of technology. With this influx of technology the equipment used in offices has changed at a rapid rate. Educational institutions are responsible for preparing students who can function in this new environment, including

individuals to operate the changing equipment along with managers and executives who are responsible for planning effective use of the equipment. However, this equipment is very expensive and virtually impossible for most school districts to afford. The purpose of this study was to develop a curriculum guide to teach word processing at the community college level through the use of the microcomputer.

Procedure

A review of literature was made to determine the status of microcomputer simulation in word processing instruction, word processing hardware comparisons on capabilities, word processing concepts included in the high school business education curriculum, and concepts appropriate for a post-secondary word processing curriculum. The research findings were then incorporated into a course guide for post-secondary educational institutions for teaching word processing through the use of a microcomputer.

Assumptions

Very little literature was found supporting the concept that microcomputers have been used to simulate word processing equipment, but since the computer has been successfully used to simulate other training procedures it was assumed that it could also be used for word processing.

Limitations

Available hardware for word processing is somewhat extensive. To identify and list all such hardware would be somewhat difficult and probably unnecessary. Therefore, the hardware identified in this paper should be viewed as representative of that which is available.

Definition of Terms

Cathode Ray Tube (CRT) - Device used as a computer terminal
which contains a television-like screen for displaying data. Most CRT
terminals also have a typewriter-like keyboard.

Central Processing Unit - Electronic components which cause
processing on a computer to occur by interpreting instructions, per-
forming calculations, moving data in main computer storage, and control-
ling the input/output operations. It consists of the arithmetic/logic
unit and the control unit.

Coding - Process of writing instructions for a computer.

Data - Representation of facts, concepts, or instructions in a
formalized manner suitable for communication, interpretation, and pro-
cessing by humans or machines.

Data Base - Collection of interrelated data stored together with
a minimum of redundancy to serve multiple applications.

Data Processing - Department in a company that is commonly
made up of systems, programming and operations.

Floppy Disk - Oxide-coated plastic disk about 8" in diameter
enclosed in a protective covering that can be used for magnetically
storing data.

Hard Copy - Printed output from an information system.

Hardware - Physical equipment in a computer system.

Input - Data used for processing on a computer system.

Microcomputer - Computer system commonly consisting of a CRT,
keyboard, and limited storage based upon a microprocessor and costing
less than $10,000.

Microprocessor - Electronic components of an entire central

processor unit created on a very small single silicon chip.

Minicomputer - Computer system which has small computer storage, slower processing speeds, and lower cost than large computer systems.

Output - Information that is produced as a result of processing input data.

Program - List of instructions to tell the computer what steps to take in solving a problem.

Software - Programs written for computer systems.

Terminal - Input/output device consisting of a typewriter keyboard and often a CRT, enabling its user to have direct contact with the computer. Used often in time-sharing environment, it can be close to or far removed from the computer.

Word Processing - Storage, manipulation, and processing of data as needed in the preparation of letters and reports using terminals and related devices.

CHAPTER 2

REVIEW OF RELATED LITERATURE

Extensive research has been conducted on using the computer for simulation purposes. For example, trainees from Navy Basic Electricity/Electronics School were assigned to receive other computer-assisted instruction or conventional individualized instruction in a segement of a course requiring use of a multimeter to measure resistance and current flow. (12:43) This data indicated that simulations of equipment on an interactive computer terminal offer a feasible alternative to special training equipment.

Cohen (4:53) described the procedures for writing and developing an educational simulation on a computer. He discussed two meanings of classroom simulation. In his study, Cohen cited the work of Emshoff and Sisson (1982) which showed how to predict and plan for possible future events. For example, prior to building a bridge, an engineer would likely simulate its behavior under extreme weather conditions and load stresses. Cohen also cited the work of Fletcher (1971) who discussed Type II simulation which attempted to provide an experience for the learner. The important aspect of these experiences offered a number of advantages over training on real equipment:

A. They were a trifle safer

B. They cost less to operate

C. The experience could be made available to a
    larger number of people

D. They took less space

E. It was possible to compress or expand time

Richards (19:34) attempted to define simulation by pointing out that although simulation can be a valuable teaching tool, in order to use them effectively teachers need to be aware of their nature, what they can potentially provide in the way of learning experiences, and also how to use them to their fullest potential. Before a teacher decides to use a simulation the following questions should be answered:

A. What learnings are produced by the experience?

B. What new learnings are produced by the activity? (19:34)

Shay (24:26) discussed the advantages of simulation and the areas in which they have the most pronounced impact. The areas listed were heightened interest, attitude changes, skills acquisition, personal growth, and cognitive learning. However, Shay also stated there were a number of disadvantages to simulations, to include limited benefits, unpredictability, lack of instructor control, investment of time and energy, monetary costs, and simplicity and complexity.

Warner (28:58) described specific ways in which office practice simulations could be measured and evaluated. She discussed five different methods for evaluating simulations. These five included assessment techniques, salary theory, evaluation of ability to establish priorities and make decisions, evaluation of work produced, and published evaluations. Warner stressed the fact that the ultimate goal be a fair, unbiased, objective evaluation.

For many decades, equipment has been used to increase productivity. Using equipment for this purpose was called automation. In the past, automation was limited to agriculture and industry.

According to Hoff (11:19) offices have the highest labor cost in business today. Approximately 75% of office costs are related to labor,

and every new wage increase and fringe benefit program for workers increases labor costs. The need to increase productivity and reduce office costs has become more and more important to management. In response to this need, automation in the office is creating a revolution in the way in which we handle and process information.

According to Quible (18:6) the development of word processing has gone through four distinct phases, each corresponding to the development of the various types of text-editing equipment. The equipment developed during phases 1 and 2 consisted of stand-alone units, while phases 3 and 4 equipment was interactive.

1. PHASE 1: MECHANICAL TEXT-EDITING TYPEWRITERS
    IBM is credited with introducing in 1964 the
    first mechanical text-editing typewriter, the
    MT/ST (Magnetic Tape/Selectric Typewriter).
    In 1969, IBM introduced a new text-editing
    typewriter, the MC/ST (Magnetic Card/Selectric
    Typewriter), which was found to be more
    functional, less costly, and easier to
    operate than its predecessor. The Mag Card II,
    a newer version of the original MC/ST, is
    presently used in some word processing
    installations along with other brands of
    systems that use mag card.

2. PHASE 2: DISPLAY TEXT EDITORS. Utilizing
    a cathode ray tube (CRT) or a gas plama
    screen, display text editors resemble TV
    screens with attached keyboards and printing
    devices. As the keyboarding takes place,
    up to a page of material is held on the
    screen. After keyboarding the document,
    the word processing specialist proofreads
    the material and makes any corrections or
    changes. Once the changes have been made,
    the information is filed on a magnetic
    media called a disk. A hard copy is then
    printed from the disk.

3. PHASE 3: COMMUNICATING STAND-ALONE TEXT
    EDITORS. The equipment in this phase is
    a stand-alone that has communicating capa-
    bilities. The material is keyboarded and
    revised in one location but can be elec-
    tronically transmitted to another location
    thousands of miles away. The communicating

capability of these typewriters made "electronic mail" a reality, which documents transmitted electronically between two locations, eliminating distribution by the U.S. Postal Service.

4. PHASE 4: INTEGRATION OF DATA PROCESSING/WORD PROCESSING TECHNOLOGY. The most recent phase in the development of the word processing concept integrates data processing and word processing technology. Several alternatives are available with the technology developed during this phase. One alternative is to use shared-logic text editors, which provide storage, retrieval, and manipulation of information capabilities. Shared-logic systems often utilize minicomputers or microprocessors.

According to Quible (18:10) the advantages of word processing are:

1. Increased efficiency for executives and support staff.

2. Higher quality documents.

3. Greater utilization of equipment.

4. Improved utilization of employee talents and abilities.

5. Increased productivity.

6. Faster turnaround time.

7. Electronic libraries of documents from which to create new documents.

8. Availability of information, alphabetic and numerical.

Extensive research has been conducted dealing with skills necessary to function in the word processing procedure. According to Ettinger (7:4) criteria that may be used in the recruitment of personnel for both correspondence and administrative secretarial positions reflect the importance of language skills, flexibility, attitude, and typewriting skills.

According to Ettinger (7:5) suggested topics to be incor-
porated in word processing curriculums are: keyboarding and
text manipulation, machine dictation and transcription, human
relations, logging, time management, recordkeeping, and general
office procedure for handling mail scheduling appointments.

The three most important compentencies included in a word
processing curriculum are language arts, human relations, and electronic
keyboarding. Correspondence secretaries need to develop extensive
transcription skills; the ability to produce final copy from a variety
of media, including longhand, rough draft, and recorded dictation; and
the ability to format, prioritize, log, maintain records, manage time,
organize work, communicate orally, perform under stress, and work as a
part of a team.

Business educators realize that word processing has had a dra-
matic effect on the employment needs of the business community. In an
attempt to deal with the paperwork explosion that has occurred in
business offices, administrative management has developed the concept of
word processing as a means of increasing office efficiency.

Ober (14:36) suggested that the following revisions be made in
the curriculum to meet the employment needs of the business community
and increasing office efficiency.

1. Less emphasis should be placed on shorthand
    speed and more emphasis on transcription
    ability.

2. If it is not economically feasible to provide
    the word processing equipment for classroom
    use, students should at least be exposed to
    machine transcription.

3. An increased amount of class time should be
    provided during the student's class time
    for such non-skill learning experiences as
    editing and abstracting copy, composing,
    and handling classified and rush projects.

4. Throughout his or her business courses the student should be exposed, using whatever means and methods available, to situations which aid in the development of those attitudes and traits which, while not unique to the word processing environment, nevertheless are more in demand there. These would include the ability to work without supervision and under pressure, the development of good judgment and initiative, and the ability to make decisions and follow through.

It is important for all organizations to provide continued training for its staff in order to provide them with the upgraded skills to handle the requirements for improving productivity in the automated office. A total training approach to all employees involved in the implementation of change caused by the installation of technology is essential. Specific training courses have been designed for support supervisors, middle management, top management, and support staff including word processing operators, administrative secretaries and records specialists. According to Ruprecht (22:36) the following topics have been presented in many companies for in-service:

Management Support Manager

1. Personnel selection

2. Job description development

3. Salary structure design

4. Career progression planning

5. Management support staff training

6. Report forms design for management communication

7. Personnel evaluation

8. Productivity measurement

9. Procedures development

10. Initial phase-in of implementation

11. Assertiveness

12. Communication Skills

13. Word processing/administrative support innovations

Management Support Staff

1. Telephone etiquette

2. Conference planning

3. Dictation skills

4. Problem solving

5. Work organization

6. Desk organization

7. Time management/priority setting

8. Scheduling

9. Work measurement

10. Decision making

11. Communications

12. Professionalism

Management/Professionals

1. Restructuring orientation

2. Departmental implementation

3. Procedures familiarization

4. Dictation skills training

5. Art of delegation instruction

Ruprecht (22:36) also listed a number of common competencies for word/data processing. She broke these down into three areas:

Skills:

1. Keyboarding - accurately and rapidly standard
   and 10-key

2. Data/Text Entry and Retrieval

3. Proofreading

4. Formatting

5. Editing

6. Data Files Management
        Building and Creating Files
        Storing Files
        Retrieving Files
        Revising Files
        Deleting Files

7. Following directions

Knowledges:

1. Computer and Word Processing terminology

2. Careers in information processing

3. Changing office

4. Role and impact of technology

5. Systems and flowcharting

6. Documentation and procedures

7. Basic understanding of word processing cycles

8. Basic understanding of hardware and its
    functions

9. Basic understanding of software and its
    functions

10. Magnetic media
        Types, uses, care, limitations

Qualities and Attitudes:

1. Detail minded

2. Logical thinker

3. Eager to solve problems

4. Inquisitive

5. Ability to work under pressure

6. Ability to meet deadlines

7. Welcome change

8. Ability to interpret and follow directions

9. Creative

10. Thorough

11. Self-motivated

12. Ability to concentrate and work without interruptions

13. Dependable

Holley (11:22) discussed changes in emphases needed in business education departments. She felt more emphases was needed in the following areas:

1. Language arts-spelling, punctuation, grammar, vocabulary, word usage

2. Proofreading, including editing and the use of standard proofread typed copy

3. Figure/symbol typing-rapidly, accurately, by touch

4. Formatting-judgment placement, visualization of finished documents

5. Typewriting from longhand copy with revisions and from proofread typed copy

6. Speed and control on documents prepared while being timed

7. Standardized procedures and formats-6-inch line on all letters and memos; full-block letter style

8. Word processing terminology-keyboarding, coding, turnaround time, software, camera ready copy, shared logic, clustering, work station

9. Using dictionaries, secretarial manuals, and other reference materials

10. Listening and following directions; reading and following directions

11. Ability to think, concentrate, make decisions, set priorities, meet deadlines, and accept responsibility

12. Machine transcription techniques

13. Machine dictation techniques

14. Ability to compose, edit, and revise documents

15. Understanding of the need for teamwork and good interpersonal relations

16. Basic time management skills

17. Opportunities for learning managerial and supervisory techniques and their importance

18. Last, but not least, the importance of the work ethic-a desire to do a good job.

Holley (11:22) also suggested decreasing emphases in certain areas of the curriculum:

1. Straight copy timed writings are not a reliable indication of a typist's ability to produce usable work in a satisfactory time period.

2. Learning many letter styles is not necessary, since the block style with open punctuation and a standard six-inch line is most frequently used in word processing settings. Other styles can be learned easily on the job.

3. Typing from textbooks with explicit directions given and material spelled and punctuated correctly is not realistic training. Instead, have students type often from proofread copy, make decisions, and follow oral directions for changes from instructions given in texts.

4. Complex tabulation problems are not hurdles to be trained for sophisticated keyboard equipment will usually be available for these applications; such machines have present tab grids, and also center, indent, and underline.

5. Spirit, stencil, and offset duplication are seldom used except in schools and churches. They can be learned on the job.

6. Addressing envelopes and typing on cards do not require extensive practice. Long address lists will usually be prepared on mailing labels; typing on cards can be learned on the job.

7. Manuscripts and manuscript styles vary so much that they can usually be learned on the job.

8. Making carbon copies is almost a lost art. Instead of indicating "cc" on a letter or memo, students probably should be taught to type "pc" meaning that a photocopy has been sent, or "c" which indicates a copy made by any method.

Cox (5:12) discussed word processing instruction in small high schools. In the small high school with only one or two business teachers there has been no room in the program to add any more courses; therefore, word processing was not included among the course offerings. Furthermore, the cost of new technology was so great that the entire school budget would suffer if this new equipment were purchased. Since only a few students would be learning how to operate the equipment and it would be idle a majority of the time, it would be difficult to justify such a purchase.

According to Cox (5:13) one of the major disadvantages in the small communities was that the businesses were small. Usually there would be only one person working in the office other than the owner/manager. The volume of work in the small office did not support the spending of thousands of dollars for special equipment that would increase office production when there was only one consumer of the office paper work.

What about school's responsibility to those students who plan to migrate to the metropolitan areas to seek employment? Upon arrival at a large company, the former student was likely to find that

previous instruction on word processing was necessary to obtain employ-

ment.

What kind of topics on word processing have been covered in small

high schools? According to Cox (5:13) the following has been taught:

1. Equipment: One of the skills that can be
    taught with limited equipment is keyboarding.
    The keyboard of today's typewriter is being
    used as the input device on most of the
    equipment found in word processing instal-
    lations.

2. An essential skill for all office employees
    is the ability to transcribe while listening
    to the dictation. Spelling, grammar, lis-
    tening, punctuation, and organization are
    all skills needed to accompany those of
    keyboarding.

3. Procedures: While on field trips, listening
    to guest speakers, or viewing films or
    slide-tape presentations, students have
    had the opportunity to learn that proce-
    dures in firms having word processing instal-
    lations will vary tremendously from the
    procedures used in a traditional office
    setting. A key point to remember is that
    word processing is utilized for economic
    purposes of saving through increased
    production.

Regardless of the depth the instructor has provided the student

about word processing, students must be made aware of the specific

terminology associated with word processing. To accomplish this task,

instructors have been teaching their students about the concept and

actualization of word processing.

According to Alexander (1:379) certain components of word

processing are necessary, regardless of the level of instruction. How-

ever, the emphasis given to the particular component changes depending

on the educational level of the institution. Secondary level instruction

has included an introduction to the concepts of word processing (including

definitions), and the effects of word processing on offices, jobs, and skills. Emphasis has been placed on basic skills and attitudes, including language skills, keyboarding, cooperative teamwork, and working under supervision.

According to Alexander (1:379) the community college has been teaching those areas appropriately taught at the secondary level, with basic skills being reviewed and reinforced. However, an added emphasis at this level has been on specialized equipment operations and the use of specialized vocabulary and the introduction to more advanced word processing application work. Supervisory skills and word processing management technique have also been included.

Alexander (1:379) reports that the four year college level instruction has included the areas described above with a greater emphasis on management systems design and analysis. Also, the four year college has provided expanded career opportunities in teaching, selling, and consulting.

The Illinois Office of Education (2:27) recently funded the development of a Word Processing Curriculum Guide at the Secondary Level. The project identified seven major competency areas for administrative and correspondence secretaries in word processing:

1. Concepts, processes, and careers in word processing

2. Verbal communication

3. Written communication

4. Equipment related skills

5. Planning, organizing, decision-making skills

6. Supervision skills

7. Business attitudes/personal development

Since 1975, development in microcomputers have come at blinding speed. According to Braun (3:225) probably the most important characteristic of the new computers is low cost.

Computers have been perceived by most people, and were developed originally, to provide powerful number-crunching capability to the user. This probably is still the most serious use of the computers, but increasingly computers are used not to do computing, but, according to Braun (3:226), more generally to process information.

According to Stocker (26:25) many of today's students are already well versed in computer concepts because they have been using a microcomputer at home or have had some other form of computer contact. Stock said (26:26) the handwriting is on the wall. The future of business education will depend on how well the use of computer-based office technology is integrated into the overall program and how well students are prepared to work in that environment.

Simcoe (25:12) felt emerging technological advances are making equipment available that will meet various specifications and applications to be selected by companies depending on need. He noted (25:12) computer/ word processing linkages have already emerged in some companies and are predicted to become even more interrelated. Some companies are utilizing word processing/computer processing teams; secretaries to do clerical jobs requiring various levels of skills; secretaries to keyboard data; text-editing offices for editing copy of keyboard operators, and midmanagement and higher levels of management to supervise and manage varying degrees of administrative detail related to the organization and functioning of the total word processing division. Therefore, it seems that the following points should be given thought by business educators: (Simcoe 25:12)

1. Research and development must be conducted to
   determine various types of clerical, secre-
   tarial, and managerial jobs that should emerge
   as a result of office technology.

2. Secondary, Post-secondary, and four-year
   programs must be established to provide
   articulation, not duplication, and flexi-
   bility of entrance and exit from programs.

3. Word processing equipment to be used in
   classrooms should include that which has
   the largest number of transferable skills
   and/operations to other equipment, however,
   complex or specialized.

4. Curriculums should be based on a common core
   of required basic skills including grammar,
   punctuation, spelling, proofreading,
   decision-making, interpersonal relations,
   and keyboard input.

5. Word processing programs must be integrally
   linked to such programs as data processing
   and the various disciplines involved, in-
   cluding but not limited to supervisory
   skills, time management, decision-making
   theory, and office design and systems ad-
   ministration.

6. Programs should require an internship that is
   cooperatively planned and supervised by
   education and business.

7. Education and business must form greater
   alliances or linkages that allow the
   training and retraining of personnel
   to be naturally systematized.

Pemberton (17:5) discussed the capabilities of microcomputers.
The point that struck him so forcibly about the microcomputer situation
was that the possibilities for either (a) cost saving or (b) extending
your capabilities were so compelling that all office functions should
be evaluated to see how many of them could be automated on a microcomputer.

According to Pemberton (17:5) microcomputers are here to stay and
they should be seriously considered as an alternative to a plain terminal.
For four office functions which include word processing, database manage-

ment, communications, and budgeting Pemberton suggested the following
equipment:

1.	Microcomputer with 64K memory & Video Monitor	$2200
2.	Disk Drives (2)	$1300
3.	Letter Grade Printer	$3000
4.	Programs for word processing, database management, communications and budgeting	$1000
5.	Auxiliary circuit boards for lower case, 80 character board	$ 700
	TOTAL	$8200

All computers are built from the same or similar components.
In most cases it is how fast and efficient the electronic components
function that make the difference, along with how much capacity they
have.

Mitchell (13:21) divided word processing equipment into five
categories. According to Mitchell (13:21) word processing equipment
includes Electronic Typewriters, Standalone Word Processing Systems,
Standalone Display Word Processing Systems, Multi-Terminal Word Processing
Systems, and Word Processing/Data Processing Office Systems. These
systems were found to be available from many different vendors in many
different price ranges, and having many different capabilities. These
differences are analyzed in Appendix A-E.

Word processing instruction must include more than just the
instruction on operating a piece of equipment. Human relations, oral
and written communication, general office procedures, and working under
pressure must also be incorporated into the instruction. Language arts –
spelling, punctuation, grammar, vocabulary, and word usage are the basis

for working in word processing. The development of these skills are most

important before a person can function as a word processor.

Hardware for word processing is extensive. Word processing

equipment range from electronic typewriters to word processing/data

processing office systems. A school district must have a curriculum

guide developed before deciding on what type of equipment to purchase.

CHAPTER 3

CURRICULUM GUIDE

Word processing can be effectively integrated into the curriculum. The growth of this management tool and its increasing utilization by business, industry, and government mandates its inclusion into the business education curriculum. The learning activities described below are designed to help students relate to real-world word processing environments. They focus on job skills needed, new terminology, word processing application, and interaction of workers and departments within a company.

It is recommended that a program in word processing be designed at the post secondary level to improve the efficiency and effectiveness of business communications through the integration of people, procedures, and equipment into an organized and managed system by using the microcomputers.

From the review of literature, experiences, and research the author has developed the following curriculum guide.

WORD PROCESSING CURRICULUM GUIDE

ONE YEAR PROGRAM AT THE

POST-SECONDARY LEVEL

(Each course 12 weeks)

Courses	Description
Communication Skills	Designed to help the student understand the need to communicate effectively with employer, fellow worker, and customer. Provides opportunity for the student to develop as an

Courses	Description
	effective employee. Also stresses improvement of listening ability, taking and giving directions, and talking with others. Practical application of fundamentals of human relations and employment application procedures may also be included.
Business Math	A study of mathematical skills using calculating machines as related to career requirements of office and/or store employees. Emphasis is placed on solving business-oriented problems such as percentage, markup, interest, bank reconciliation, payroll, and inventories.
Data Processing I	Introduces the student to the basic concepts of data processing and provides a background of the various types of data processing problems which may be encountered in business. A study of data processing equipment, with emphasis on the modern electronic computer and programming in BASIC are correlated with "hands-on" experience on a microcomputer system.
Keyboarding	Includes an introduction to (1) the basic techniques of touch typing leading to the mastery of the standard alphabetic and numeric keypads, (2) the use of special functions keys, (3) the use of drill work for development of speed and accuracy, and (4) standard formats for correspondence,

Courses	Description
	tables, and manuscripts.
Word Processing Concept	This course is designed to explain the evolution of the convergence of word and data processing into information processing, including discussion of equipment, information networks, electronic machines, procedure manuals, job descriptions, and ergonomics.
Employer/Employee Relations	Defines needs of the worker and management and brings these elements together so that workers and management can work together productively and cooperatively with economic, psychological, and social satisfaction.
Personal Development	Instruction in the attributes of personality, appearance, personal traits, and human relations as they relate to successful employment. The purpose is to create an awareness of the importance these factors play in job success and promotion potential of employees.
Communication Skills II	Designed to continue improving the student's speaking, reading, writing, and listening skills. Emphasis is placed on job application.
Advanced Business Math	A continuation of Business Mathematics which includes an in-depth study of inventory, depreciation, insurance, business finance, and annuities.
Business Machines	Designed to provide operational skills in adding and calculating machines.

Courses	Description
Computer Programming in BASIC	This course will provide experience and practice in designing and writing a variety of business-oriented programs covering important programming techniques applicable to all disciplines. Use of the program development cycle will enable the student to write programs in a systematic and disciplined manner and will lay the foundation for subsequent study. Programming experience will also help the student to develop a deeper understanding and appreciation of the electronic computer, its capabilities, and its limitations.
Keyboarding Applications	Includes (1) continued development of speed, accuracy, and use of electronic functions, (2) introduction to electronic word processors in regard to storage, retrieval, and automatic capabilities, (3) applications dealing with formatting and editing correspondence, tables, and manuscripts.
Word Processing Applications	An emphasis on all phases of word processing applications (input, revision, storage, and output functions), including instruction on machine transcription, the electronic typewriter, and microcomputers to produce business communications.
Records Management	Instruction in fundamentals and systems of filing, selection of equipment and supplies, procedures for organizing and managing records systems, and solutions to records management problems.

Courses	Description
Business Correspondence	A study of modern trends in business correspondence. The student is given an opportunity to compose various kinds of letters, memorandums, and reports commonly written in business. Emphasis is placed on improvement of existing skills and abilities in typing. Job application procedures may be included.
Office Accounting	Varied course of study determined by the abilities and experiences of the students. The basic principles of bookkeeping are learned in actual work type problems.
Data Processing II	Deals with advanced data processing concepts, the major application for businesses, and systems analysis. Practical applications and programming in BASIC on the microcomputer system are emphasized.
Information Processing Applications	Consists of hands-on experience dealing with typical information processing jobs such as correspondence, reports, statistical and technical documents, mailing lists, forms, and file handling.
Office Management	Emphasizes competencies that allow technicians to assume responsibility without direct supervision, exercise initiative and judgment, make decisions within the scope of their authority -- the requisites for promotion.

Courses	Description
Software Concepts Management	Presents an overview of the types of software available for computer and word processing systems, explores the uses of systems software and applications software, presents an analysis of software development, and identifies software packages which are available (their advantages and disadvantages).
Office Systems and Trends	Includes a study of Management Information Systems, office ergonomics, personnel considerations, and the management of change brought about by technological advances. Analysis of the office of the future.

APPLICATIONS WITHIN CURRICULUM

Creation:
Teleconferencing
Multifunction work stations (terminals and personal computers)
Calendars, schedules, diaries
Library/external data base research

Capture:
Dictation
Word Processing
Optical character recognition
Digital voice
Computer

Keyboarding: (Input)
Typewriters
Intelligent (electronic) typewriters
Terminals and personal computers

Distribution:
Telecommunications
TWX/Telex
Communicating Word Processors
Computer to Computer
Switching or electronic mail systems (voice, data, image, text)

Networking

Replication:
Micrographics
Typesetting
Graphics
Intelligent copiers
Duplication Systems
Facsimile

Storage and Retrieval:
Electronic storage/retrieval systems
Automated micrographics systems

Disposal:
Shredders
Electronic Storage Systems (computerized)

COMPETENCIES WITHIN CURRICULUM

Skills:
Keyboarding - accurately and rapidly
Data/Text Entry and Retrieval
Proofreading
Formatting
Editing
Data Files Management
   Building and Creating files
   Storing files
   Retrieving files
   Revising files
   Deleting files
   Following directions

Knowledges:
Computer and WP terminology
Careers in word processing
Changing office
Role and impact of technology
Systems and flowcharting
Documentation and procedures
Basic understanding of Word Processing cycles
   Commonalities and differences
Basic understanding of hardware and its functions
Basic understanding of software and its functions
Basic understanding of programming
Magnetic media
   Types, uses, care, limitations

Qualities and Attitudes:
Detail minded
Logical thinker
Eager to solve problems

Inquisitive
Ability to work under pressure
Ability to meet deadlines
Welcome change
Ability to interpret and follow directions
Creative
Thorough
Self-motivated
Ability to concentrate and work without interruptions
Ability to tolerate routine work
Dependable

This curriculum guide is intended to be used in a post-secondary word processing program. Through the development of a program of this nature word processing concepts and practice can be taught by using the microcomputer.

CHAPTER 4

SUMMARY, CONCLUSION, RECOMMENDATION

Summary

Word processing can be effectively integrated into the curriculum. The growth of this management tool and its increasing utilization by business, industry, and government mandate its inclusion into the business education curriculum. The integration of word processing into the curriculum should not be limited to concepts. Students should be given opportunities to apply concepts in learning activities that approximate real-word situations. Then and only then will students be able to relate fully to this new office environment.

Components of word processing in business education departments are necessary, regardless of the level of instruction. It is important that articulation be realized between the different levels. At the secondary level emphasis has been on basic skills and attitudes, including language skills, keyboarding, cooperative teamwork, and working under supervision. These skills need to be reinforced at the community college level with added emphases at this level on specialized equipment operations and the use of specialized vocabulary and the introduction to more advanced word processing application work. The four year college has included the areas described above with a greater emphasis on management systems design and analysis. This articulation between the different levels is necessary.

Conclusion and Recommendation

Emerging technological advances are making equipment available that will meet various specifications and applications to be selected by schools depending on needs. Computer/word processing linkages have

already emerged in some companies and are predicted to become even more interrelated. Some companies are utilizing word processing/computer processing teams, secretaries to do clerical jobs requiring various levels of skills; secretaries to keyboard data; text-editing offices for editing copy of keyboard operations; and midmanagement and higher levels of management. Therefore, in conclusion it is recommended that the following points should be given thought by business educators:

1. Research and development must be conducted to determine various types of clerical, secretarial, and managerial jobs that should emerge as a result of office technology.

2. Secondary, post-secondary, and four-year programs must be established to provide articulation, not duplication, and flexibility of entrance and exit from programs.

3. Word processing equipment to be used in classrooms should include that which has the largest number of transferable skills and operations to other equipment.

4. Curriculums should be based on a common core of required basic skills including grammar, punctuation, spelling, proofreading, decision-making, interpersonal relations, and keyboard input.

5. Word processing programs must be integrally linked to such programs as data processing.

6. Education and business must form greater alliances or linkages that allow the training and retraining of personnel.

Word processing offers the greatest challenge to business education the field has experienced. In the next few years, educators will spend enormous sums of money on microcomputer hardware and software. As a result, most major microcomputer manufacturers and many local

computer dealers are entering the educational market. This is very encouraging: more competition for the dollars implies more price competition. More competition also means a much longer and arduous task in selecting the system that fits your need.

It is recommended that you begin your selection process by creating a Computer Selection Committee, composed of teachers, administrators, and community people. It should meet regularly to formulate the final decision. The committee's charge should be twofold:

1. Decide on the objective or reasons you want computers in your school.

2. Decide on the software you want to meet your objectives.

Once you have established your objectives, you should then prepare a letter to vendors, requesting a demonstration of materials to meet those objectives. Only after seeing the equipment in operation can you be sure that this is what you need to meet your objectives.

By following the curriculum guide in Chapter 3 and the recommendations made in Chapter 4 word processing can be effectively integrated into the curriculum and the correct equipment can be selected to meet your schools needs in word processing.

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APPENDIXES

APPENDIX A

I. Characteristics of Selected Electronic Typewriters

    A. Price Range
        $1,000 - $3,000

    B. Storage Characteristics
        1. Read Only Memory (ROM)--instructions "fixed"
            in chip for electronic application of selected
            keyboarding functions--e.g. automated centering
        2. Random Access Memory (RAM) plus ROM--in addition
            to fixed instructions (ROM), space is provided
            for storing keystrokes for revision, automatic
            printout, and short term storage
        3. Most RAM storage is volatile--when electricity
            is cut off, keystrokes are lost
        4. RAM storage generally less than a page to 40
            pages

    C. Input/Output Characteristics
        1. Keyboard and printer are in the same unit
        2. Some systems have a thin window--displays
            2-40 characters of a line
        3. When printing automatically on electronic
            typewriters that have RAM storage, it is
            not possible to input
        4. Should it be desirable to communicate with
            a computer and/or networked with other
            electronic office equipment, it is
            necessary that the electronic typewriter
            have communications capabilities--this
            feature is not available on all electronic
            typewriters
        5. Output speed for automatic printing generally
            in the 150 to 400 word a minute range
        6. Print devices
            a. Ball (15 to 20 cps -- 150 to 200 wam)
            b. Wheel (17 to 35 cps -- 175 to 400 wam)

    D. Best used for daily correspondence

    E. Partial list of Electronic Typewriters
        1. Adler 1010 (132 chs, com opt); 1030 (8K,
            upgrade 16K, com opt, 3 ch display)
        2. Brother EM-1; EM-2 (1K, 16 ch display)
        3. Cannon A P400 (512 chs); A P500 (512 chs,
            upgrade 32K, 20 ch display)
        4. Contitronics Eight-K (8K, upgrade 40K, com
            opt, 20 ch display)
        5. Exxon Model 110, 120 (10K, com opt, 24 ch
            display)

6. Facit 1885 (4K); 8100 (1K, 40 ch display)
   8110 (6K, 40 ch display)
7. Hermes Top-tronic 42 (8K, 20 ch display)
8. IBM 65 (7.4K, replaces Models 50 & 60,
   upgrades to an 85; 85 (15.5K, com opt,
   replaces Model 75)
9. Olivetti 121; 201 (830 chs, 2 ch display)
   221 (830 chs, com opt, 20 ch display) --
   The 201 and 221 have nonvolatile memory;
   231 (16K, com opt, 20 ch display)
10. Olympia ES 100; 101; 105 (1K); 110 (7.5K)
11. Royal 5010 (132 chs, com opt); 5030 (8K
    upgrade 16K, com opt, 3 ch display)
12. Silver-Reed EX 55
13. Smith-Corona Typetronic (10 chs)
14. Syntrex Aquarius 1 (830 chs, 2 chs display
    nonvolatile memory)
15. 3M 200 (224 chs buffer, com opt); 400
    (830 chs, 20 ch display, com opt, nonvolatile
    memory)
16. Xerox Memorywriter 610 (1K chs); 615 (5K);
    620 (9.4K com opt, 20 ch display); 625
    (19.3K, com opt, 20 ch display)

Category I - Characteristics of Selected Electronic Typewriters

Name Model #	*Storage Capacity	**Print Speed	Thin Window	Communi-cation	Purchase Price	Maintenance	Lease
Adler 1030	8,000-16,000 chs	17.5 CPS Wheel	3 chs	yes	$1,825	$150/yr	dealer dependent
Contitronix 8K	8,000-40,000 chs	14 CPS Ball	20 chs	yes	$2,075	$260/yr	dealer dependent
Exxon 110	1,000 chs	30 CPS Wheel	no	yes	$1,800	$180/yr	$95/mo
Exxon 120	18,000 chs	30 CPS Wheel	24 chs	yes	$2,350	$300/yr	$150/mo
IBM Electronic 65	7,400 chs	15.5 CPS Ball	no	no	$1,315	$160/yr plus incident charge	not available
IBM Electronic 85	15,500 chs	15.5 CPS Ball	no	yes	$1,716	$160/yr plus incident charge	not available
Olivetti 221	830 chs	18 CPS Wheel	20 chs	yes	$1,755	$180/yr	available
Olivetti 231	16,000 chs	20 CPS Wheel	20 chs	yes	$2,790	$276/yr	available
Olympia ES105	1,000 chs	20 CPS Wheel	no	no	$1,595	available	available
Silver-Reed EX 55	none	20 CPS Wheel	no	no	$1,225	available	available
Syntrex Aquarius 1	830 chs	18 CPS Wheel	no	no	$1,795	$360/yr	available
Xerox 610-Memorywriter	946 chs	20 CPS Wheel	no	no	$1,430	available	available
Xerox 620-Memorywriter	9,600 chs	20 CPS Wheel	20 chs	yes	$2,000 range	available	available

*For an approximate conversion of characters to pages divide by 2,500.

**For an approximate conversion of CPS to words a minute multiply CPS by 10.

APPENDIX B

II. Characteristics of Selected Standalone Word Processing Systems

   A. Price Range $4,000 - $10,000

   B. Storage Characteristics
      1. Systems have ROM and RAM storage
      2. In addition these systems have a magnetic media
         storage device--which may be housed within the
         keyboard unit or may be in a separate device
      3. Storage media
         a. Current systems
            (1) Mini diskettes (5¼", 60,000 characters--
                25 pages)
            (2) Standard diskettes (8", 256,000 characters--
                100 pages)
         b. Earlier systems
            (1) Mag Cards (1 page)
            (2) Cassettes (15-30 pages)
            (3) Cartridges (12-15 pages)
      4. Some category I--Electronic typewriters are upgradable
         to Category II systems

   C. Input/Ouput Characteristics
      1. Keyboard and printer are in the same unit
      2. Some systems have a thin window display--less
         than 1 line
      3. When printing automatically, it is not possible
         to input
      4. Communications not available on all systems in
         this category
      5. Output speed in the 150 to 600 wam range
      6. Print devices
         a. Ball
         b. Wheel

   D. Best used for
      1. Correspondence
      2. Forms
      3. Repetitive documents

   E. Partial list of Standalone WPS with Magnetic Media Storage
      1. Adler SE 2000B and 2000 D
      2. A.B. Dick Magn 1 and Magn 2
      3. Dictaphone 2000
      4. Exxon Model 120E, 140, 140D
      5. Hermes Top-tronic 51
      6. IBM Memory 50 & 100, MC-A MCST-II, MC 6240
      7. Olivetti 351
      8. Olympia 6020
      9. Royal SE 6000B and 6000D
     10. 3M 800 Electronic Typewriter
     11. Xerox 800 & 850

Category II - Characteristics of Selected Standalone WPS

Name Model	Storage Media	*Media Storage	Thin Window	**Print Speed	Commun- icatons	Purchase Price	Maintenance	Lease
A.B. Dick Magna II	Mag Card	5K chs	32 chs	45 CPS Wheel	optional	$5,300	$846/yr	3rd Party
Dictaphone 2000	Single or Dual Diskette	256K chs ea	37 chs	40 CPS Wheel	optional	$7,750	$576/yr	$230/mo 5 yrs
Exxon 140D	Dual Mini- diskette	60K chs ea	24 chs	24 CPS Wheel	optional	$5,950	$828/yr	available
IBM MC 6240	Mag Card	5K chs	no	55 CPS Wheel	optional	$8,800	$1,188/yr	$418/mo 2 yrs
IBM Memory 100	Internal Mag Belt	200K to 400K chs	no	15.5 CPS Ball	none	$4,550	$552/yr	$245/mo 2 yrs
Olivetti ET 351	Single or Dual Diskette	73K chs ea	40 chs	30 CPS Wheel	standard	$5,290	$500/yr	available
Olympia 6020 Textsystem	Single or Dual Mini- Diskette	70K chs ea	20 chs	17.5 CPS Ball	none	$5,490	$468/yr	$156/mo 5 yrs
Royal SE 6000D	Mini- Diskette	64K chs	40 chs	22 CPS Ball	optional	$4,495	$590/yr	3rd Party
Xerox 850 Display	Dual Diskette	300K chs ea	24 chs	45 CPS Wheel	optional	$7,650	$950/yr	$375/mo 2 yrs

*For an approximate conversion of
 characters to pages divide
 characters by 2,500.
**For an approximate conversion
 of CPS to words a minute,
 multiply CPS by 10.

APPENDIX C

III. Characteristics of Selected Standalone Display
     Word Processing Systems

A. Price range $6,000 to $15,000

B. Storage characteristics
   1. Category three systems have a magnetic media
      storage device. The housing for the storage
      unit may be:
      a. Built into the unit that includes the
         display screen
      b. A separate unit
      c. Built into the printer unit
   2. Storage media
      a. Current systems
         (1) Standard diskette--8"
         (2) Mini diskette--5¼"
         (3) Micro diskette--3½"
      b. Media configuration
         (1) Single diskette
         (2) Dual diskette
         (3) Double sided
         (4) Dual density
      c. Earlier systems
         (1) Mag cards
         (2) Cassettes
   3. Some Category three systems upgradable to
      Category four systems

C. Input/output characteristics
   1. A display resembling a TV screen
      a. Revision and document formatting done
      b. The number of lines displayed on the
         screen varies--6 to 66 line
         (1) Screens that display 6-53 lines
             referred to as partial page displays
         (2) Screens that display 54 or more lines
             referred to as full page displays
      c. The screen width in terms of characters
         displayed is 80--example of other screen
         widths include 64, 72, and 102 characters
      d. When documents are wider than the screen,
         it is critical that horizontal scrolling
         be available on the terminal
   2. Generally the printer and the keyboard are in
      separate units. The exceptions are:
      a. Lanier Typemaster
      b. Category one machines upgraded to Category
         three. A screen and a diskette drive are
         added to the electronic typewriter--examples
         are Syntrex and Systel

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      3. With the keyboard and printer in separate units, operators can key a document while a document entered earlier is printing
      4. Communications available on most machines in this category
      5. Output speed is in the 150 to 2,000 wam range
      6. Print devices
         a. Wheel
         b. Ink jet
         c. Thimble/crown
         d. Ball

D. Best used for
      1. Heavy editing (lengthy documents within limits of magnetic media storage)
      2. Variable data (example--law office)
         a. Wills
         b. Trusts
         c. Lease agreements

E. Special features of Standalone Display WPS
      1. Faster print mechanisms on machines in this category compared to one and two-- 225-2,000 wam
      2. Larger memories--50 or more pages per media unit
      3. Split keyboard/printer simultaneous input/ output of different documents
      4. Many systems user programmable for additional word processing, records processing and/or data processing activities--examples are
        - IBM Displaywriter, Lanier Super No-Problem, and CPT 8000, 8100, 8520, & 8525--and units that have alternate operating systems such as CP/M
      5. Some systems have shared printer options; 2 to 4 keystations per printer is the general range

F. Partial list of Display Standalone WPS
      1. AES (Plus, 100, & Alphaplus)
      2. Basic four WS 100
      3. Burroughs (RII, 240, 250; R III 320, 330, 340 OFISwriter)
      4. Compucorp (Simplifier 12, 40, Model 686, 745, 765, 775, 785, 790, 795)
      5. CPT (8505, 8510, 8515, 8520, 8525)
      6. Exxon (510, 520, 1800 & 2000)
      7. Datapoint (1500, 1800, 3800)
      8. A.B. Dick (Magna III)
      9. DEC (WS 78, DECmate I & DECmate II)
    10. Dictaphone Dual Display and the 6000
    11. Honeywell Infowriter
    12. IBM (Display-writer System)

13. Lanier (No Problem, Super No Problem, Typemaster)
14. Lexitron (1201, 1202, 1303)
15. MBI (System I and II and 3000)
16. NCR WorkSaver Systems
17. Norelco (WPS)
18. Olympia EX 100
19. Phillips Business System (Micom)
20. Royal (7000 Omniwriter)
21. Sony (Series 35)
22. Syntrex Aquarius
23. Systel II
24. Wang (WPS 5 & Wangwriter)
25. Wordplex (80-2, 80-3)
26. Xerox (850 & 860 Page Display)

Category III - Characteristics of Selected Standalone Display WPS

Name Model #	*Storage Capacity	**Storage Media	Display	Print Speed	***Shrd Prntr	Commun- icatons	Purchase Price	Maintenance	Lease
Burroughs OFISwriter 349	288K	Dual Diskette (DS & DD)	30 lns 72 chs 200 scroll	55 CPS Wheel	yes	optional	$13,500	$900/yr	available
CPT 8100	315K	Dual Diskette	54 lns 80 chs segmntd scr	45 CPS Wheel	yes	optional	$15,990	$890/yr	$416/mo 2 yrs
A. B. Dick Magna III	273K	Dual Mini Diskette (DS & DD)	20 lns 80 chs segmntd scr	55 CPS Wheel	yes	standard	$13,500	$1,200/yr	$455/mo 2 yrs
Dictaphone Dual Display	500K	Dual Diskette (DS & DD)	66 lns 102 chs standard	40 CPS Wheel	yes	optional	$12,500	$1,080/yr	$424/mo 5 yrs
Honeywell Infowriter	1.3 Mb	Mini Diskette (DS & DD)	24 lns 80 chs 10 columns	55 CPS Wheel	yes	standard	$10,495	$1,000/yr	None
IBM Displaywriter	987K	Dual Diskette (DS & DD)	25 lns 80 chs segmntd scr	60 CPS Wheel	yes	optional	$10,375	$1,068/yr	$340/mo 3 yrs
Lanier Super No- Problem	280K	Dual Mini Diskette (DS & DD)	28 lns 80 chs 254 scroll	43 CPS Wheel	yes	optional	$13,290	available	available
Phillips Info Systems Micom 2001/E	300K	Dual Diskette	31 lns 80 chs 250 scroll	45 CPS Wheel	yes	standard	$12,900	$1,440/yr	$466/mo 3 yrs
Sony Series 35	280K	Dual Micro Diskette (DS & DD)	60 lns 80 chs virtual scr	55 CPS Thimble	yes	optional	$13,825	-----	-----
Wang Writer	300K	Mini Diskette (DS & DD)	24 lns 80 chs segmntd scr	20 CPS Wheel	no	not announced	$ 6,400	$900/yr	$375/mo 2 yrs
Xerox 860	300K	Dual Diskette	66 lns 85 chs 156 scr	45 CPS Wheel	yes	optional	$15,050	$1,250/yr	$550/mo 2 yrs

*2½ Mb (megabytes) is equivalent to 1,000 pages
**DS & DD refers to double sided, doubled density diskettes
***Shared printer option allows 2 or more keystations to utilize the same printer

IV. Characteristics of Selected Multi-Terminal
Word Processing Systems

A. Price Range over $15,000

B. Storage Characteristics
1. Category four systems include a central
storage unit--information/documents key-
boarded at the terminals that make up the
system are transmitted to the central
storage unit
2. The information that resides in the
central storage unit is shared--individuals
at the terminals do not have to rekey infor-
mation
3. Category four systems are referred to as
shared logic, shared resource, or a combina-
tion of the two
4. Storage media
a. Most of the Category four systems use a
hard (rigid) disk that holds in excess
of a million characters
b. In addition these systems usually have a
diskette unit so that information can be
entered on to the hard disk and/or removed
from the hard disk

C. Input/output characteristics
1. The display terminals for a Category four
system come in two varieties
a. Smart terminals (the keyboard/screen)
have ROM/RAM storage within the unit--
multi-terminal WPS with smart terminals
are referred to as shared logic systems
b. Intelligent terminals (in addition to the
keyboard and screen, terminals have their
own diskette units as well as ROM/RAM
storage)--multi terminal WPS with intelligent
terminals are referred to as shared resource
systems
2. Many of the multi-terminal systems are programmable
by the operators
3. Output speed is in the 500 to 50,000 wam range
4. Print devices
a. Wheel
b. Ink jet
c. Line printers
d. Thimble/Crown
e. Laser

D. Best used for
   1. Heavy editing (limited only by capacity of the memory)
   2. Variable data (especially when there is extensive data to draw from)

E. Special features of Multi-terminal WPS
   1. Access to central data base
   2. Direct hookup to other locations and equipment (e.g. computers, photocomposers, printers)
   3. High speed printout--line printers, image printers
   4. CRT Display
   5. Split Keyboard/printer for simultaneous input/output different documents
   6. Extensive modularity--multiple input and/or output stations may be added
   7. Alternative systems include
      a. shared logic (smart terminals)
      b. shared resource (intelligent terminals)
      c. combination of shared logic/shared resource

F. Partial list of Multi-Terminal WPS
   1. ACT (Ultra-Text II)
   2. Axxa (System 90)
   3. Basic Four (Dataword Systems 410, 610, 730 & Wordstream 1200, 2200)
   4. Burroughs (OFIS 1 System)
   5. Cado Systems (20/IV WP and 40/IV WP)
   6. Comptek (Accutext/Barrister 200 & 220)
   7. Compucorp (Simplifier 12, 40, 686, 745, 765, 775, 785, 790, 795)
   8. CPT (Word Pak)
   9. Datapoint
  10. Decision Systems (Micro/Word)
  11. A.B. Dick SL (Magna III w/Shared Resource Station and the SL)
  12. Dictaphone (Dual Display)
  13. Digital Equipment Corp--DEC (WS 82, WS 200, WPS- 11M)
  14. Exxon (4200)
  15. Four-Phase (ForeWard System)
  16. Honeywell (DPS 6/30)
  17. IBM (3720, 5520, 5530, 5540, 5550 systems)
  18. Lanier (CS, SS, CS/SS, Wordplex 4 and 7)
  19. Lexitron (Ray-text)
  20. NBI (OASys 8 and 64)
  21. NCR (WorkSaver System WS-100 Mini-Cluster and the WS-200)
  22. Nixdorf (Multi-text 8840)
  23. Phillips Information System (2002)
  24. Syntrex Gemini
  25. Wang (WPS 20, 25, 30, and OIS 105, 115, 125, 130, 140, 145, & the Alliance 250)

26. Wordplex (80-4)
27. Word Info Systems
    (TDS-16A, 16B, 16C)

Category IV - Characteristics of Selected Multi-Terminal WPS

Name Model #	Storage Capacity	Storage Media	*KS	**Prntrs	Display	Prntr Speed	Programmable	Communications	Purchase
A.B. Dick Magna SL	300K	Diskette	3	3	66 lns 102 chs 250 scroll	55 CPS Wheel	None	optional	$14,500
DEC 200	20Mb 256K	Disk Diskette	8	4	24 lns 80 chs segmntd scr	45 CPS Wheel	BASIC & others	optional	$18,565
IBM 3730	24.1Mb 256K	Disk Diskette	Combined Maximum 31		24 lns 80 chs	55 CPS Wheel	Variety	standard	Based on Config.
IBM 5520 Model 50	130Mb 1Mb	Disk 1 Diskette	18	12	24 lns 80 chs 172 scroll	60 CPS Wheel	None	standard	Based on Config.
Lanier CS/SS-A	600K	4 Diskettes	8	10	28 lns 80 chs 254 scroll	45 CPS Wheel	None	optional	Based on Config.
Royal Shared System	32Mb 320K	Disk Dual Diskette (DS & DD)	16	18	24 lns 80 chs 255 scroll	45 CPS Wheel	BASIC & others to be announced	optional	Based on Config.
NBI OASys 8	10Mb 300K	Disk Diskette	6 Combined Maximum 8	4	16 lns 80 chs segmntd scr	55 CPS Wheel	None	optional	Based on Config.
NBI OASys 64	132Mb 250K	Disk Diskette	24 Combined Maximum 32	12	16 lns 80 chs virtual scr	55 CPS Wheel	None	optional	Based on Config.
Wang WPS 25	5Mb 300K	Disk Diskette	Combined Maximum 14		24 lns 80 chs segmntd scr	35 CPS Wheel	None	optional	$22,600
Wang OIS 145	275Mb 300K	Disk Diskette	24	8	24 lns 80 chs segmntd scr	35 CPS Wheel	BASIC	optional	$36,300

*Column identifies number of keystations that can be connected to CPU.
**Column identifies number of printers that can be connected to CPU.

APPENDIX E

V. Word Processing/Data Processing Office Systems

A. Price Range
    1. Microcomputer under $15,000
    2. Minicomputers $15,000 to $500,000
    3. Mainframe computer systems over $500,000

B. Special features of WP/DP Office Systems
    1. Serves as one method of integrating the WP/DP
        functions--the same equipment is used for
        both activities
    2. The ability to perform WP/DP functions is
        provided via software
    3. Generally the systems in this category
        were designed for data processing functions--
        there are exceptions: e.g. Honeywell DPS 6
        and Level 6, IBM 8100
    4. WP/DP Office Systems configuration similarities
        with other categories of WPS
        a. Microcomputers have the same features and
            components as Standalone Display WPS units
        b. Minicomputers have the same features and
            components as Multi-Terminal WPS classified
            as shared logic
        c. Mainframe computers that are marketed as
            WP/DP Office Systems generally are con-
            figured with one or more minicomputers
            attached to the mainframe--examples are
            a Honeywell Level 6 minicomputer or a
            Burroughs 3900 mainframe with a Burroughs
            95 minicomputer
    5. There are several added benefits of using WP/DP
        Office Systems that are in the larger mini-
        computer/mainframe level:
        a. Electronic mail
        b. Attachment of executive workstations
        c. Electronic filing
        d. Other automated office functions
    6. There are several concerns related to WP/DP
        Office Systems
        a. WP software, especially on microcomputers,
            is not as efficient as the software found
            in Category 3 and 4 systems
        b. The terminals used on many of the systems
            in this category are not user friendly--
            function keys (e.g. key labeled "delete")
            are not available on the keyboard
        c. In some cases it may not be desirable that
            the WP/DP functions be integrated

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