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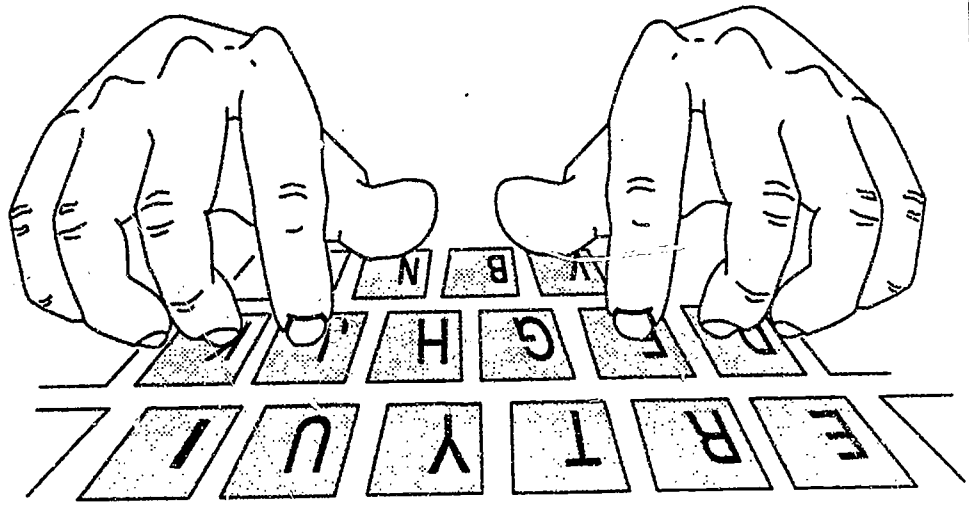
ABSTRACT

This manual is intended for use in teaching keyboarding at the elementary, secondary, or postsecondary level. It presents techniques for teaching basic keyboarding skills. The manual is divided into six sections. The first section defines keyboarding, describes who should learn to keyboard, discusses who should teach keyboarding skills, and outlines some basic considerations in organizing keyboarding instruction. The instruction section includes information for teaching basic keyboarding technique. Suggestions and strategies for planning and implementing a keyboarding program are given in the next section. A list of the 24 publications used in developing and updating this document is provided. The glossary defines common keyboarding and computer terms. The resources section identifies 2 resource libraries, 17 texts, 17 software instructional packages for keyboarding-related instruction, and 25 publishers. (YLB)

Teaching Keyboarding



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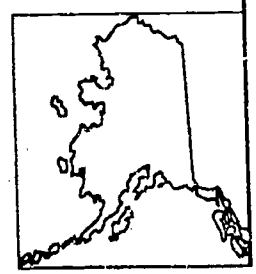

Walter J. Hickel, Governor

Developed by
Alaska Department of Education, Office of Adult and Vocational Education

Commissioner
Gerald B. Covey

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FOREWORD

Teaching Keyboarding is intended for use by anyone who is teaching keyboarding, whether at the elementary, secondary or even post secondary level. This manual presents techniques for teaching basic keyboarding skills. Information on editing, proofreading and other skills associated with word processing can be found in regular office education materials.

Computer literacy has become a basic skill which should be taught to everyone. Computers are used in the home, school and workplace. Students need to learn basic keyboarding techniques and functions in order to record, retrieve, manipulate data and use the keyboard for communication.

The trend is to teach computer literacy at the elementary level but frequently keyboarding skills are omitted. Teaching keyboarding skills will enable students to use computers and will ensure that students do not have to "unlearn" poor techniques later. It will also enable secondary programs to concentrate on integrating computers into all classes, both as a learning tool and as a communication device.

Educators at all levels have the challenge to be change agents. They should encourage students to be open to new technology and learning and to prepare themselves for the continually changing work environment. It is important to realize that changes are on-going and that all programs must be kept up-to-date.

This manual is divided into six sections:

- *Planning* defines keyboarding, describes who should learn to keyboard, discusses who should teach keyboarding skills, and outlines some basic considerations in organizing keyboarding instruction.
- *Instruction* includes information for teaching basic keyboarding technique.
- *Suggestions and Strategies* provides hints and strategies for planning and implementing a keyboarding program.
- *References* provides a listing of the research used in developing and updating this document.
- The *Glossary* defines common keyboarding and computer terms.
- *Resources* identifies resource libraries, publishers, texts and software instructional packages for keyboarding-related instruction.

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Teaching Keyboarding was originally developed in 1986 by a task force of Alaskan educators. The following teachers provided their guidance and expertise:

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- **Gaye Sarvela**, Business Instructor, Palmer High School, Palmer

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PLANNING

This section provides a definition of keyboarding, describes who should learn to keyboard, discusses who should teach keyboarding skills, and outlines some basic considerations in organizing keyboarding instruction.

What is keyboarding?

Keyboarding is the term used to describe the activity of entering information into various types of equipment using the touch system on a keyboard. Keyboarding is the ability to perform touch inputting skills by using alphabetic, numeric, symbol and function keys on a computer or typewriter keyboard. The main focus is input.

Touch typing is striking the keys with the proper fingers without looking.

At all levels, beginning keyboarding instruction must emphasize correct techniques including posture and accuracy. Instruction must also cover touch keyboarding techniques such as correct finger placement and rhythm. It is recommended that instruction include using the touch technique on numbers and most frequently used operative keys.

What is the difference between typewriting and keyboarding?

Typewriting and keyboarding are not the same. Taught correctly, keyboarding will provide a foundation skill for typewriting or production keyboarding. The focus of keyboarding is on entering information. Typewriting or production keyboarding emphasizes formatting skills, use of word processing software, vocational applications, productivity and hard copy production. The main focus is on output.

Why teach keyboarding?

Just as the pen and the telephone are an accepted means of communication, computers are the major mode of communication in business, government and education today. Keyboarding is integral to computer literacy because it is the skill for communicating with computers.

Keyboarding today is as basic as reading, writing and math. More and more computers are found at all levels of education and are being used as tools of learning in reading, writing, spelling and computing activities.

The speed and accuracy of the keyboarding skill directly affects the time involved in the communication process. Correct techniques and grammar

taught early have a critical impact on the ability to speak later in life. Bad habits are hard to break. To be truly literate, people must be able to communicate with both machines and people.

To function effectively in their jobs, many workers besides secretarial and administrative support employees need keyboarding skills. These include the production manager who uses the computer terminal to locate specific documents; the inventory assistant who keeps track of shipments of stock and receipts of new items via the computer terminal; the airline agent who uses the computer terminal for reservations, passenger check-ins, and seat arrangements; and the business executive who uses a computer terminal to access current information useful in making managerial decisions. Keyboarding has become a skill primary to the vocation of many, secondary to the vocation of others, and important in the conduct of personal business by all.

When is a keyboarding program needed?

Keyboarding should be taught just prior to the grade level at which students begin frequent or repeated use of the keyboard. Studies have shown that the self-taught hunt-and-peck method is much slower and very difficult to unlearn, thus inhibiting further development of desired skills. Keyboarding may be taught on any keyboard. This skill is readily transferable from one standard keyboard to another.

Keyboarding instruction should be integrated into the scope and sequence of an education program.

There are many reasons for incorporating keyboarding instruction at the K-8 levels. They include the potential for time savings, efficient computer use, proper technique development, increased interest in writing skills and improved computing skills.

The following questions have been helpful in determining placement of specific keyboarding instruction:

a. Are students using the keyboard for school work?
b. Are students using the computer as much as ten minutes per day?
c. Are students using the keyboard for more than single-entry answers?
d. Is frequent and repeated use of most of the computer keyboard required?

A yes answer to any of the above questions indicates a definite need for a keyboarding instructional program at the level being considered. The greater the amount of keyboard entry, the higher the skill level required.

How much time is needed?

Optimum: Thirty or more hours of hands-on instruction delivered in daily increments, followed by periodic practice and review.

Minimum: Twenty-two or more hours of hands-on instruction. If only alphabetic keys are covered, twelve hours of instruction in daily increments will provide a usable skill.

The length of each session can range from 15 minutes to 55 minutes, depending on age, interest and ability of the learners.

Keyboarding instruction at the elementary level should combine a business educator's competence in keyboarding methodology with the elementary teacher's knowledge of psychomotor skill development and student learning patterns. **Satisfactory results will not be obtained by students using software packages on an individual basis without direct teacher supervision.**

How much skill is needed?

Adequate student achievement includes correct posture at the computer, proper techniques for striking keys, accurate fingering of keys, use of operative keys and basic computer accessories.

Technique is important in the early lessons of keyboarding. A new learner who is making too many errors probably needs special practice on certain keys and may improve accuracy by improving concentration or using special drills. Students using computer keyboards should not be encouraged to use the back-space or delete key to correct errors when learning the new keys. Electronic error corrections are part of the touch method on an electronic keyboard and are acceptable to use in timings and production work.

Speed is not the main objective of a beginning keyboarding course. Technique and touch typing should be the main emphasis. A minimum standard of fifteen to twenty words per minute for elementary students (third grade and up) should be achieved prior to student use of the computer for tasks requiring a significant amount of keyboarding. Secondary students should reach a minimum of twenty to forty gross words per minute.

The keyboarding course should include evaluation of technique as well as measurement of performance on straight-copy timed writings. Inputting numeric copy may also be included depending on the objectives of the course.

Where does keyboarding fit?

There is a place and role for acquiring and refining keyboarding skills at both the elementary and secondary levels.

At the elementary level, instruction varies with the age and grade level of the learner and the objective the course. Checking for proper techniques and establishing the proper length of practice periods are critical to the development of keyboarding skills. As the student gets older, the techniques will be further refined. Elementary keyboarding instruction may also be provided in summer school or after-school course offerings.

At the secondary level, keyboarding can be a separate class or integrated into a computer business applications class. Ideally, the business education classroom will be equipped with adequate computers to enable the teacher to expand into computer applications for business. A course entitled *computer keyboarding* will help change the attitude that typing is only for secretaries and attract more students.

There are several options available for integrating keyboarding into the secondary curriculum, depending on the amount of time to be allocated to the course.

Option 1: Thirty Hours
This course would cover the use of proper techniques including posture, hand position, eye direction, work habits and touch keyboarding using alphabetic keys, operative parts, accessory equipment and software (basic care and maintenance of machine and software), and terminology.

Option 2: Forty-five Hours
All of Option 1 skills, plus the following: numeric keys, common symbols, additional typing speed, introduction to word processing software, introduction to formatting correspondence, stroke refinement and accuracy development.

Option 3: Ninety Hours
All of Option 1 and 2 skills, plus the following: proofreading and editing, formatting reports, tables, statistical and technical typing, stroke

refinement and speed building/accuracy, composition at the keyboard, and use of the numeric key pad.

Option 4: Full Year Course
All of Option 1, 2, and 3 skills, plus developing and refining skills for entry-level employment.

Students in the secondary level with basic keyboarding skills can interface with the business education classroom for skill-building or more advanced business applications such as word processing, communications, electronic spreadsheets, graphics, database management, in addition to other business education content areas.

What type of equipment should be used?

Optimum: Microcomputers

Minimum: Electronic typewriters. Keyboards without input or display capabilities but with movable keys. Each should be used in conjunction with appropriate activities.

The equipment trend throughout the nation is a switch from typewriters to computers. It has long been recognized that computers have the capability to do many types of work in addition to word processing. The cost of computers has been decreasing and many cost less than typewriters. Maintenance costs of computers are less than typewriters because there are fewer moving parts.

Computers, rather than typewriters, should be installed in business classrooms whenever possible. Students need most of their training on the equipment they will ultimately use in order to get the most amount of transfer from their training to the workplace. It is also important to train students on how to use the typewriter. Electronic typewriters may be used for preparing various business forms including job and school applications.

If the classroom is mixed with computers and typewriters, have students learn to use both machines. Electronic typewriters can be used for initial keyboard instruction and later for short rotations or for keying various forms, typing envelopes or short documents. Microcomputers should be used for keying lengthy documents.

Some computers have the capability to switch from the QWERTY keyboard to the DVORAK keyboard, which is a more efficient keyboard arrangement.

arrangement. Some government agencies and large businesses have converted to the DVORAK keyboard although its popularity has not replaced the use of the QWERTY keyboard. Keyboard instruction should be based on the keyboard arrangement which students are likely to use in subsequent years. While other keyboards are available, care should be taken to use keyboards that have long-lasting use.

CHECKLIST FOR PLANNING A KEYBOARDING PROGRAM

adapted from *Guidelines for Teaching Keyboarding,*
Maine Department of Educational and Cultural Services, Augusta, Maine, 1987

Planning Activities

_____ General meeting of interested people to develop ideas has been held including: administrators, business teachers, community members, computer coordinators, elementary teachers and school board members.

_____ Proposal developed and approved including:

- _____ Determining a need exists.
- _____ Developing a keyboarding curriculum.
- _____ Allocating class time.
- _____ Infusing into existing curriculum such as:
  - _____ Language Arts
  - _____ Social Studies
  - _____ Computer Literacy
  - _____ Math
  - _____ Other, _____
- _____ Selecting equipment.
  - _____ Costs identified.
  - _____ Software selected.
  - _____ Number of computers and keyboards needed available.
- _____ Selecting facilities.
  - _____ Facility has enough electrical outlets.
  - _____ Facility has enough tables/chairs of appropriate size.
  - _____ Arrangement of furniture/computers conducive to training.
  - _____ Facility large enough to accommodate class size.
- _____ Identifying and securing funding through grants, businesses, or others.

_____ Program preparations:

- _____ Instructors assigned such as business teacher or business teacher and elementary teacher team.
- _____ Instructor training completed such as college course, summer training session or inservice training.
- _____ Equipment purchased.
- _____ Facility improvements completed.
- _____ Program promoted.

What cautions must be observed in choosing materials?

There are three major types of materials available for teaching keyboarding: textbooks, word processing software and software instructional packages. Preview expensive software before purchasing. Check to see if materials are specifically designed for the developmental level of the students and adhere to the teaching philosophy for keyboarding instruction.

Textbook selection should look at the sequence of instruction, adherence to principles of keyboarding skill development and the instructional objectives that can be met with the text. Word processing software may be used in conjunction with textbooks as the medium for keyboarding.

Word processing and software package selection will be dependent on the equipment used, the way the program operates, ease of use, the cost of the software and most importantly, the popularity/use of the software in local offices. In elementary schools, emphasis should be on age level, not business applications. Software used in business is usually different from software used in lower grades.

A keyboarding instructional package should support initial instruction rather than replace an instructor. Games can be enjoyable, although many games focus on speed rather than technique and may force hunt-and-peck methods of keying. Some software tends to measure short-term speed goals rather than the correct techniques needed to achieve long-term speed development. Beware of instructional software which is not based on sound educational methodology. Most game programs are appropriate only for drill, remediation or enrichment.

Keyboarding texts may be used with computer instruction. Word processing programs provide the opportunity for learning basic functions of a program in conjunction with learning basic keyboarding skills. More emphasis may be placed on following and sequencing procedures for using word processing software in keyboarding instruction. Students can become more familiar with equipment and software for production keyboarding.

Keyboarding materials may be evaluated based on the following:

- the maturity and achievement level of the students using the materials
- the illustration and frequent emphasis on keyboarding techniques
- the pacing of new learning appropriate for the grade level

- the provision of frequent review and/or reinforcement lessons
- clearly identified goals of initial instruction and practice
- the use of sound criteria for skill development
- clearly marked and easy to understand directions for practice
- skill-building lessons that precede and follow introduction of new material
- the provision of frequent assessment for skill development

The following pages provide information and tools for evaluating keyboarding and microcomputer software.

EVALUATING MICROCOMPUTER SOFTWARE FOR KEYBOARDING

adapted from:
Teaching Keyboarding/Typewriting by Gary N. McLean,
Delta Pi Epsilon Rapid Reader No. 5, Delta Pi Epsilon, Little Rock, AR, February 1984

Gary McLean developed the following criteria for evaluating microcomputer software for keyboarding instruction:

1. Keys should be introduced together with visual guidance on correct finger usage and technique for striking the keys.

2. Meaningful letter combinations should be used as soon as possible after introducing a key. Words, phrases and sentences should be comprised of those letter/key combinations occurring most frequently in ordinary keyboarding use.

3. Sound and sight should both be used to provide feedback about stroking accuracy.

4. Gross speeds reported should include all strokes made, correct and incorrect. Error correction backspaces may also reasonably be part of these rates.

5. Messages on success and judgments about qual of the speed or accuracy rate should be based on both individual learner progress and research-based error expectations at different rates.

6. Provision should be made within the program for upper- and lower case letter display on the screen and the use of natural shift key operation for capital letters.

7. Provision should be made within the program for allowing computer-controlled interval timing while learners key from copy of their own choice-including composition—or their teacher's choice.

8. Emphasis should be on technique only in the beginning, with lenient accuracy standards, simply to prevent the inappropriate use of the repeat key or the keying of "garbage". Later, emphasis on accuracy should be available. Each objective should be developed separately. The specific objective should be available at the choice of the student or the teacher. Thus, the choices available should be feedback on technique, speed, or accuracy, or all three.

9. The approach used should be appropriate to the developmental stage of the user.

10. Vocabulary use should be appropriate for the grade-level involved and should provide multiple options for individual differences.

11. A management system should be in place to maintain student performance records and to permit students to begin where they last stopped. Ideally, such a system would display student performance in graph format to identify performance trends quickly and easily.

12. The software should be able to accept a wide range of input speeds to at least 100 gwpm.

13. Periodic pacing should be in blocks rather than stroke-by-stroke to avoid metronomic rhythm, except in the very beginning.

14. Drills should use "regular" prose, rather than specially contrived materials. Teachers should have the capability to input their own materials.

15. Users should be able to escape a program at any time and return to the menu without having to reboot the system. Likewise, the menu should be detailed enough to permit numerous entry points into the program. The option to bypass individual screens should be available to teachers.

16. Motivation can be enhanced with techniques to encourage self-competition rather than competition with other students. Gaming formats must use *appropriate keyboarding technique.*

17. Letter graphics must be clear so that letters are readily recognized, e.g., "a" and "s" are often difficult to distinguish on some existing software.

18. Most microcomputers use a wraparound approach. For positive transfer, beyond the lessons introducing keyboard, options need to be provided for wraparound, "jump line," and use of the return key.

19. During introductory lessons, the screen should be kept relatively "clean." Only the line being typed should be displayed, along with the student input.

20. The program should be personalized, using the student's name, animated graphics, and messages of positive reinforcement (though none of these approaches should be overdone).

21. Software should be standalone, i.e., it should not require print material support and should be self-instructional.

22. The program should not be color dependent, as many schools will not have access to color monitors.

THE TERRIBLE TEN IN EDUCATIONAL PROGRAMMING

(My Top Ten Reasons for Automatically Rejecting a Program)

By Dr. Ann Lathrop, Associate Professor, California State University, Long Beach

(Originally appeared in *Educational Computer*, 1983, reprinted with permission by the author.)

A few short years ago, we were generally pleased if a program would run. Today we demand much more from the courseware that we purchase. My "Terrible Ten" may differ from yours. Each of us applies our own criteria to the evaluation process. Yet I urge you to reject programs with any of the negative factors outlined here and to communicate to the publisher your reasons for the rejection. Our refusal to purchase courseware that is merely "adequate" can help to upgrade the overall quality of the instructional software market.

1. **Audible response to student errors.** Drill-and-practice programs are the worst offenders. They are most frequently used by the less able students and NO student should be forced to advertise to the entire class that s/he has just made another mistake.

2. **Reward failure.** Hangman programs are classic examples of making it more fun to fail, by the use of clever graphics, than to succeed.

3. **Any sound that cannot be controlled.** Sound can be effective as motivation or reward, but is often distracting in the classroom or library media center. Constant repetition of the same sound also becomes extremely annoying.

4. **Technical problems.** Programs marketed today MUST run smoothly without errors.

5. **Uncontrolled screen advance.** It is frustrating to have the screen advance while you are still reading it, and it is boring to wait for long seconds after finishing. It is unnecessary to guess how long a screen should be displayed; let the user control the speed.

6. **Inadequate instructions.** We are no longer willing to guess how to operate a program.

7. **Errors of any kind.** Mistakes in factual content, spelling, grammar, etc., are totally unacceptable.

8. **Insults, sarcasm and derogatory remarks.** Students MUST NOT be attacked or belittled by the program.

9. **Poor documentation.** Instructional objectives, suggested student activities, instructions for teacher modification of the program and other classroom-related information should be standard with good courseware.

10. **Denial of back-up copy.** If publishers insist on copy-locking their software, they should provide one free back-up copy. We are responsible for showing our good faith by refusing to make or to accept illegal copies of software for classroom use and by using our back-up copy for archival purposes only.

SAMPLE SOFTWARE EVALUATION

developed by MICROSOFT and the Northwest Regional Educational Laboratory

Package Title: _____ **Producer:** _____
Evaluator: _____ **Organization:** _____
Date: _____

____ Check here if this evaluation is based partly on your observation of student use of this package.

SA=Strongly Agree
A= Agree
D=Disagree
SD=Strongly Disagree
NA=Not Applicable

Content Characteristics

1. The content is accurate.	SA	A	D	SD	NA
2. The content has educational value.	SA	A	D	SD	NA
3. The content is free of race, ethnic, sex and other stereotypes.	SA	A	D	SD	NA

Instructional Characteristics

4. The purpose of the package is well-defined.	SA	A	D	SD	NA
5. The package achieves its defined purpose.	SA	A	D	SD	NA
6. Presentation of content is clear and logical.	SA	A	D	SD	NA
7. The level of difficulty is appropriate for the target audience.	SA	A	D	SD	NA
8. Graphics/color/sound are used for appropriate instructional reasons.	SA	A	D	SD	NA
9. Use of the package is motivational.	SA	A	D	SD	NA
10. The package effectively stimulates student creativity.	SA	A	D	SD	NA
11. Feedback on student responses is effectively employed.	SA	A	D	SD	NA
12. The learner controls the rate and sequence of presentation and review.	SA	A	D	SD	NA
13. Instruction is integrated with previous student experience.	SA	A	D	SD	NA
14. Learning can be generalized to an appropriate range of situations.	SA	A	D	SD	NA

Technical Characteristics

15. The user support materials are comprehensive.	SA	A	D	SD	NA
16. The user support materials are effective.	SA	A	D	SD	NA
17. Information displays are effective.	SA	A	D	SD	NA
18. Intended users can easily and independently operate the program.	SA	A	D	SD	NA
19. Teachers can easily employ the package.	SA	A	D	SD	NA

20. The program appropriately uses relevant computer capabilities.	SA	A	D	SD	NA
21. The program is reliable in normal use.	SA	A	D	SD	NA

Quality

Write a number from 1 (low) to 5 (high) which represents your judgement of the quality of the package in each division:

_____ Content Characteristics

_____ Instructional Characteristics

_____ Technical Characteristics

Recommendations

_____ I highly recommend this package

_____ I would use or recommend use of this package with little or no change. (Note suggestions for effective use below.)

_____ I would not use or recommend this package. (Note reasons under weaknesses.)

Describe the potential use of the package in classroom settings:

Strengths:

Weaknesses:

Other comments:

Who should teach keyboarding?

At both the elementary and secondary level, the teacher should be trained in keyboarding and/or typewriting methodology.

In small schools, the training should be conducted by a person who is a proficient typist, who understands skill development and has been taught keyboarding techniques.

What training should teacher-training institutions provide?

Every teacher-training institution should require pre-service coursework to ensure that graduates have knowledge of the uses of computers in education as well as skills for teaching keyboarding. Teachers in every K-12 classroom need to know how to teach and monitor correct keyboarding skills.

What training should districts provide?

Instructors must continue to seek resources to assist with upgrading their skills and knowledge to meet the challenges of new and emerging technologies. Schools need to provide release time and funding for inservice activities for professional staff to implement teaching of keyboarding skills.

All classroom instructors should be inserviced in keyboarding instruction so they can monitor and reinforce student keyboarding skills integrated throughout the curriculum. Business education teachers share the responsibility for promoting keyboarding courses in their schools. Teacher trainers should be experienced, qualified business instructors.

INSTRUCTION

Basic Keyboarding Skills

Alphabetic Keys
Numeric/Symbol Keys
Function Keys
Techniques
Theory

Skill Development

- *Stroking Speed & Accuracy*
- *Sustained Stroking Skills*
- *Improved Techniques*
- *Efficient Use of Equipment*

In order to be truly proficient in keyboarding, students need to learn the following:

- correct hand and arm position
- proper placement of fingers on home row keys
- correct eye direction without looking at keys
- proper posture
- correct work habits
- proper striking technique

Psychomotor learning theory suggests students learn a new key by *kineosetics*, where the muscles in the finger memorize a key's location. Correct body position, hand position and key stroking are the keyboarding techniques that are essential to skill development.

Using correct keyboarding technique will help avoid carpal tunnel syndrome, reduce physical fatigue and work stress, and increase stroking speed and accuracy.

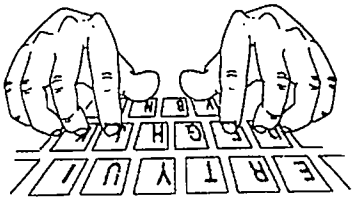
There are a wide variety of activities which teachers can use to teach keyboarding skills. Some of these activities include:

- demonstrating use of manipulative parts of the keyboard including operative keys
- demonstrating the correct method of striking the keys
- demonstrating correct posture
- teaching proper keystroking from any of the beginning lessons and drills found in a variety of keyboarding and typing texts and software available.
- practicing reinforcement and remedial drills for keyboard reaches, alpha-numeric, and operative parts
- practicing and modeling good work habits
- using a keyboarding techniques checklist to evaluate individual progress
- using timed writings to measure speed and accuracy development

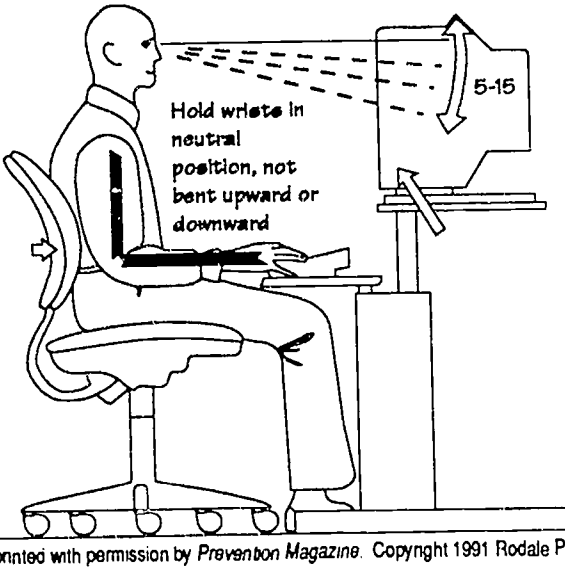
The following highlights the standard approach to introducing new keys.

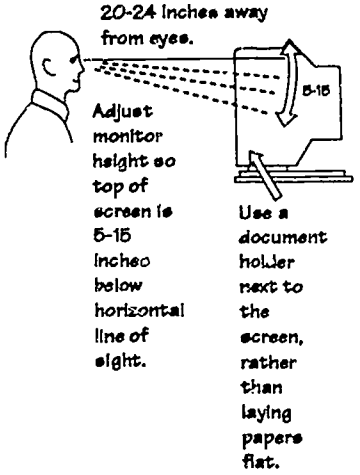
- Direct students to locate new key on keyboard.
- Show the location on a wall chart or keyboard.
- Have students study a reach-stroke illustration.
- Demonstrate the reach.
- Have students place hand in keying position.
- Have students key without looking.
- Dictate the key several times.
- Dictate a short row of words (from text) that use the new key.
- Assign a short practice drill.
- Evaluate performance, correct posture and/or stroking.

Hand Position



- Fingers should be curved.
- Wrists should be low and off the machine.
- The forearm should be parallel to the slant of the keyboard.
- The thumb should be positioned close to the center of the space bar. Either the right or left thumb may be used.
- The rest position on the keyboard is always on the home row.
- Fingers 1 or 4 on both hands must be anchored.
- Elbows should be relaxed and close to sides; they should not swing out as reaches are made.





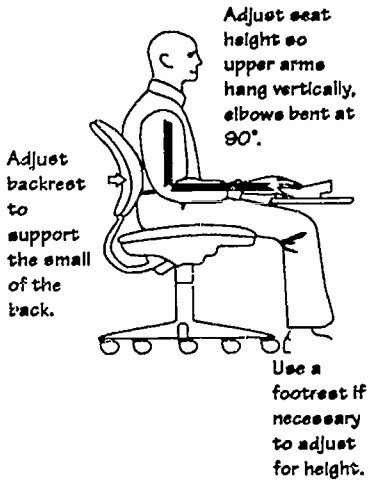
Eye Direction

- Eyes should be on copy. Looking at the keyboard is a poor substitute for learning what it feels like to properly stroke each key. It is difficult to break the habit of finger watching.
- Materials should be located on the left for left-handers, and on the right for right-handers for comfort.
- Use a typing stand or copy holder to prevent eye strain. Clips are available for attaching copy to the side of the monitor.

Work Habits

Stress these skills to insure maximum efficiency and success:

- read and follow directions
- ask for clarification; ask questions
- listen attentively
- stay alert and relaxed
- stay on task
- be cooperative
- proofread all work before printing or removing from typewriter



Proper Posture

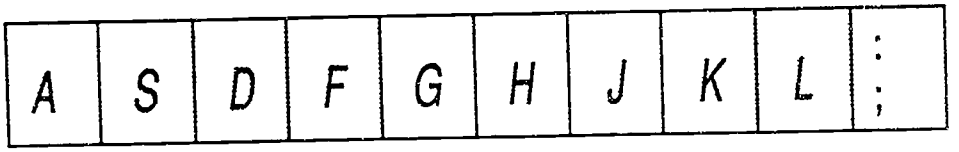
- Sit up straight and tall.
- Place feet flat on the floor, one slightly ahead of the other.
- Face the keyboard squarely, body centered with J.
- Curve fingers on home row.
- Hold thumb slightly above center of space bar.
- Keep eyes on the monitor or copy.

Proper Keystroking

- Use quick, snappy strokes.
- Key rhythmically with even strokes without looking.

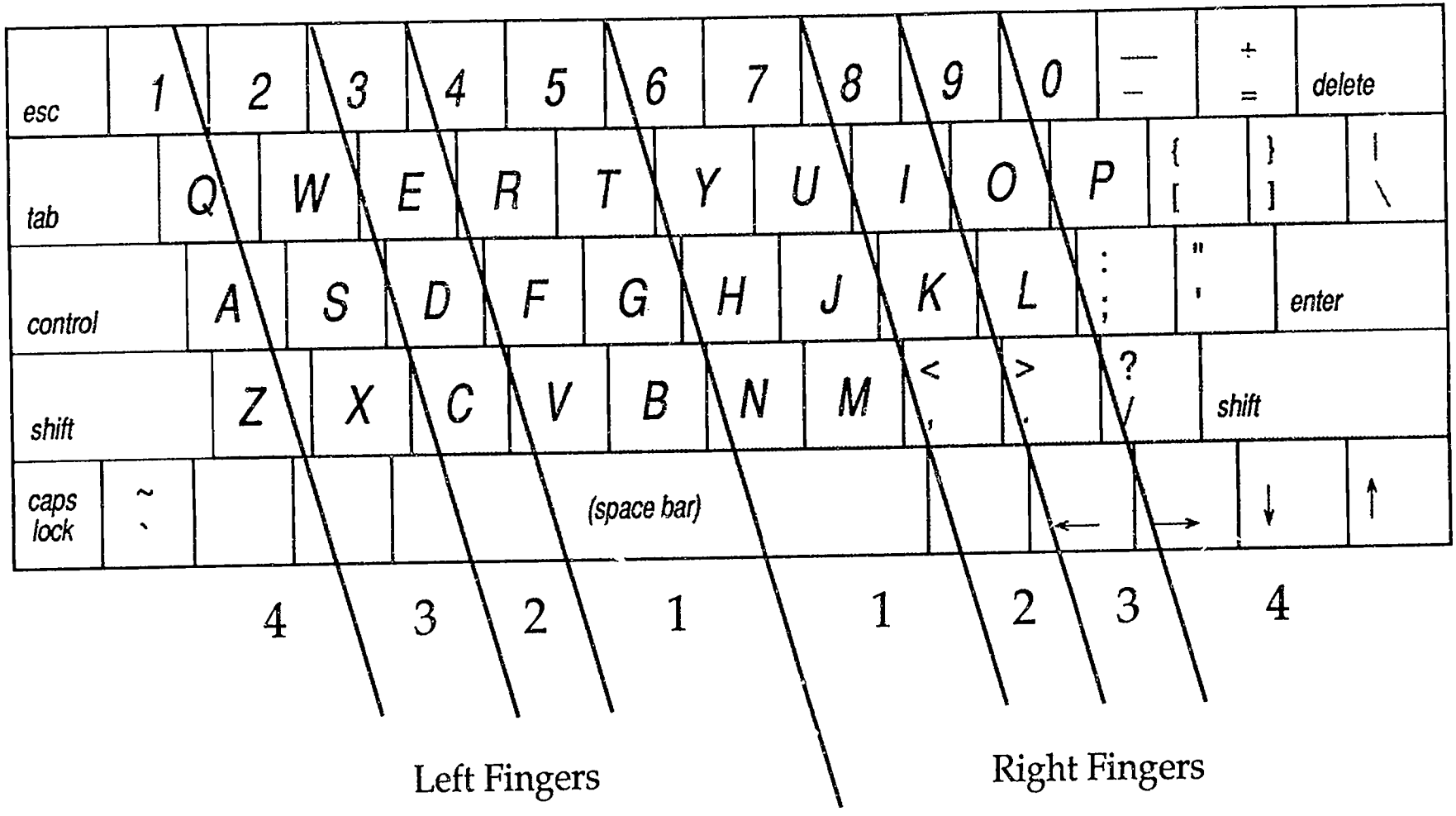
Learning the Home Row Keys

When students are first introduced to keyboarding, the steps on the following page can be helpful to acquaint them with the *home row* position:



- Drop hands at side. Now lift your hands. Note how your fingers are curved when relaxed.
- Place your hands on the second row of keys. This is called *home row*—where your fingers will be placed on the keyboard. Make sure your fingers are slightly curved (relaxed) and your wrists are low and off the keyboard.
- Look at the keyboard and find the letters **ASDF**.
- Put the little finger of your left hand on the letter **A**.
- Drop your other fingers down on the **S, D and F**.
- Put the little finger of your right hand on the **;**.
- Drop your other fingers down on the **L, K and J**.
- Keep your fingers curved.
- Rest all your fingers on the home row.
- Rest a thumb on the space bar. Use your right thumb if you are right-handed or your left thumb if you are left-handed.
- Keep your wrists low, off the keyboard and table. Do not rest your palms on the keyboard.
- Drop your arms to the side and repeat the process until you can find the home row keys easily without looking. Check home row position, move your fingers to the middle. Are there two keys separating your right and left hands?
- Remember what it feels like to have each finger on the proper key.
- The proper position is with the fingertips lightly touching the home keys. Your hands should be turned in toward each other slightly so the fingers will be in a curved, upright (not slanting) position. Wrists should be low but not touching the keyboard.
- You are now ready to learn to touch type or keyboard!

If you are using microcomputers for instruction, you may find it necessary to use a word processing program for the initial presentation of the alphabetic keys. To save instruction time, have the computer installation *networked* so that loading the word processing program can be facilitated quickly.



Presenting the Numeric Keyboard

Students will need to know how to use the numeric row on the keyboard. They may also learn to use a 10 keypad if available on the keyboard.

The home position/finger reach method is used when occasional keying of numbers is required.

The following identifies the finger positions for the 10 keypad:

- position the index finger of the right hand on the 4
- middle finger on 5
- ring finger on 6
- the 4 finger is used to strike both the 7 and 1 keys
- the 5 finger is used to strike both the 8 and 2 keys
- the 6 finger is used to strike both the 9 and 3 keys
- the right thumb or index finger is used to strike the 0 key

Error Correction

The *touch method* includes corrections on electronic and microcomputer keyboards. But in the initial stages of keyboard instruction, teachers should encourage students to move their fingers as rapidly as possible and not stop and correct errors. Stopping to correct errors can inhibit speed development and encourage a "stop-and-correct habit" that could be hard to break.

In directed practice, students will find the number of errors decreases through correct initial reaches. The automatic correction of an error forces the keyboarder to look away from their copy, use three strokes to make their corrections, and take the time to find their place in the copy before continuing.

Immediate error correction is acceptable for straight copy and production task testing. Do not correct errors on timed writings.

Keyboarding Evaluation

Technique can be evaluated based on technique checklists. A sample checklist follows this page.

Keyboarding speed may be evaluated in several ways: by error limits or net words a minute where errors are subtracted from the gross words a minute. Most grading techniques look at the two components of

keyboarding skill separately.

According to keyboarding research, reliability is maximized when gross words a minute (gwam) and errors are recorded separately, e.g. 25 gwam, 3 errors. This kind of evaluation provides information to students and teachers for remediation. When these scores are reported separately, it is easy to determine whether the student needs to focus on keyboarding speed or accuracy. When using keyboarding instructional software, gross speeds should include all strokes made, correct and incorrect. It is important to identify the evaluation used for reporting speed scores when using keyboarding instructional software.

Only one error is charged to any one word, no matter how many misstrokes the word contains. Use the following rules to identify an error:

- any incorrect stroke
- any incorrect punctuation or omitted punctuation
- incorrect spacing after a word or punctuation
- omitted word
- repeated word
- transposed letters or words
- incorrect vertical spacing or indentations

KEYBOARDING TECHNIQUE CHECKLIST

adopted from Verdell Jackson

This example may be tailored to meet individual classroom/student needs.

A = Acceptable
N = Needs Improvement
U = Unacceptable

	After 1 hour	After 5 hours	After 10 hours	After 15 hours	After 20 hours
Posture					
Sits up straight					
Feet flat on floor					
Eye Direction					
Eyes on copy/monitor					
Eyes on typing stand/copy holder					
Hand Position					
Fingers curved and off keyboard					
Forearm parallel to keyboard or slightly above					
Elbows at sides					
Anchor fingers in place					
Keystroking					
Quick, sharp, even strokes					
Reaches made from home row					
Uses proper fingers					
Operates space bar correctly					
Operates shift keys correctly					
Operates enter key correctly					
Operates tab key correctly					
Work Habits					
Follow directions					
Listens attentively					
Alert and relaxed					
Stays on task					
Cooperative					

Touch keyboarding

Touch keyboarding/typing is learning the keys and placement of fingers on the keys so well that keyboarding is automatic.

Keyboarding software programs might be used for reinforcement and skill building after the student has been introduced to proper techniques for touch keyboarding. Proper technique should be demonstrated, reinforced and evaluated continually. **Instructional materials, including software are not intended to replace teacher contact.**

Why teach touch keyboarding?

The *hunt-and-peck method* is a time consuming, inefficient process of keyboarding. The *touch method* increases keyboarding skill through efficient use of time.

There is a hierarchy of sensory input to the brain. Sight takes precedence over touch, and sight-learning tends to extinguish touch-learning. Thus, students who learn to type by sight (the "hunt-and-peck" method) suppress their abilities to learn to type by touch. If students practice typing by looking at their fingers, they aren't learning anything. The more students look at their fingers, the more they have to look at their fingers. (adapted from **Softalk**, June 1984, by John R. Tkach. *Please Touch: Toddlers and Typing*, pg.32)

Production keyboarding

Production keyboarding builds upon mastery of keyboarding skills. Students first learn keyboarding skills and basic procedures of style and format. Once those skills are mastered, students learn to use word processing software. Students build upon their skills using word processing software to meet standards of document production that parallel those of business and industry.

Production keyboarding is described as the time it takes to complete the final copy of an assignment. Non-keyboarding time is when a student interrupts the keyboarding to perform another function related to the production of final copy (e.g. reading instruction, proofreading, saving, printing).

Production keyboarding should emphasize effective work habits to enhance speed and accuracy. Evaluation of production keyboarding techniques should include the time it takes to create, edit, format, keyboard, save, re-edit, print, and submit an assignment to an instructor.

SUGGESTIONS AND STRATEGIES

Suggestions and Strategies

Various ways to increase and improve the teaching of keyboarding are highlighted in the following section. These ideas have been compiled from several sources. This section is organized by: classroom organization, keyboarding instruction and keyboarding technique.

Classroom Organization

1. Begin class on time. This may require asking a student to take roll, taking roll at the end of the period, taking roll from papers that have been collected, or taking roll during drill or timed writings at the beginning of the hour, or using a computerized reporting system identifying students logged into computer during class time.

2. Use students' time effectively; give assignments to keep each student busy 100% of the time.

3. Establish an atmosphere for encouraging student success. Avoid emphasizing negative aspects of students' skill development. Better results are achieved from positive incentives than negative ones.

4. Develop classroom procedures that allow for the maximum amount of time for skill acquisition.

5. Help students organize:

   - use *technique charts* to record progress in keyboarding
   - set-up timed *writing progress charts* for recording speed and accuracy rates
   - set up *logsheets or assignment sheets* to record assignments and points or values earned

6. Provide goals for individual students rather than for the group. Set short and long term goals and give feedback on progress.

7. Use meaningful activities, not busy work.

8. Provide directions with practice. Give time allotments for each assignment.

9. Make students responsible for getting work in by a deadline.

10. Make sure class has appropriate size desks and chairs for students.

11. When using computers, provide each student with their own disk for saving daily exercises and assignments.

12. Utilize the advantages a software package provides for enhancing keyboarding instruction. Daily and weekly lesson plans and bjectives can be presented on the screen.

13. Provide feedback and reinforcement on a daily or regular basis.

14. Remember that a teacher on their feet is worth five in their seats. Circulate around room to monitor and adjust technique.

15. Provide students with certificates of completion or performance for keyboarding course.

Keyboarding Instruction

1. Use demonstration/modeling on a daily basis to illustrate correct technique. Complex movements should be broken down and demonstrated slowly several times. A keyboard set up at the proper level when standing so students can observe is helpful.

2. Observe every student each day and evaluate technique at least once a week. Do not be obvious in conducting the evaluation. In most cases, the student should not be aware that they are being evaluated. Show the student the evaluation immediately. Explain and demonstrate to the student the correct technique for areas which have been marked unacceptable.

3. Use self-evaluations and peer evaluations once you have evaluated students and modeled correct technique.

4. Give immediate feedback. When students are learning the keyboard, evaluate technique, not papers, as often as possible.

5. Teach use and care of equipment, organization of the work area and the importance of a positive work attitude.

6. Write instructions on a transparency, the board or a handout; this will prevent students from writing in the texts.

7. Use taped lessons, clap or tap rhythm using a pointer to establish keyboarding rhythm.

8. Establish the proper mind set for learning what it feels like to type without looking. Help students visualize themselves typing.

   - Blindfold the students and dictate, making up words using the letters learned that day. A blindfold can easily be made by folding a sheet of paper in half and stapling rubber bands to each edge. The rubber bands go over the ears.
   - Divide the keyboard at the correct position with a piece of yarn or string to illustrate right and left hand usage for younger students.
   - Prevent screen watching by turning off monitor.

9. Have students type from overhead projected drill lines to help them learn to type without looking at the keys. This method gives the teacher the opportunity to observe students' techniques.

10. Present one key at a time, 5 to 7 minutes per key. Present two to three keys per day after the home row.

11. Introduce additional letters as finger motions rather than as individual key locations.

12. Provide time for students to have practice days or breaks without teaching any new keys during initial keyboard instruction.

13. All keys previously taught should be reviewed prior to learning new keys.

14. Do not allow students to look at keys, even at the beginning. Looking is a substitute for learning touch typing. Spot key watchers and help them immediately.

15. Encourage students to initially verbalize letters, numbers and symbols to assist with concentration as they think about what it feels like to type each key.

16. Encourage students to spell to themselves long words or difficult phrases which also help with accuracy.

17. Use keyboard wall charts and handouts to facilitate locating keys on keyboard and understanding the function of special keys.

18. The first few weeks of instruction should concentrate on simple drills to learn the keyboard.

19. Use short speed writings to help force students to look away from their hands and keyboard. Use 30-second or one minute technique timings or power drives to encourage skill development.

20. Keyboarding is a sequential activity. Do not use any instructional materials that require students to use skills they have not already learned.

21. Teach theory on a need-to-know basis. Reinforce the importance by requiring correct application throughout course.

22. Brief, frequent, regularly scheduled instruction is more beneficial than random, sporadic and lengthy practice sessions.

23. Expectations in terms of typographical errors and straight copy errors can be more stringent for those working on microcomputers because of the ease of correction. Increased productivity and increased quality are reasonable expectations for those keyboarding on microcomputers.

24. Build speed by (adapted from presentation by Gail Modlin of Gregg/McGraw-Hill):

    - using easy material
    - providing short intervals first (10-15 seconds)
    - practicing daily
    - maintaining balance
    - using tallies
    - watching out for fatigue
    - stressing technique
    - maintaining a steady pace
    - pacing

25. To increase speed (adapted from **Keyboarding Curriculum Guidelines**, WA, 1991):

- use material made up of alternate-hand words (such as wish, work, they, show, blame, auditor, profit)
- left-hand and right-hand drills
- weak finger drills
- difficult reach drills
- short memorized phrases or sentences
- 12-30 second speed spurts
- paced timings with quarter, half, three-quarter minute calls
- word or short phrase dictation

When using speed drills, emphasize correct techniques. Do not be too concerned with accuracy.

26. Text to increase speed should be short. Longer text should be used to measure speed, short text to develop speed.

27. To improve fluency of motion, use a repetition of easy material including words, phrases, sentences, short paragraphs, and speed writings. Errors should be disregarded in this type of practice.

28. To improve accuracy, use one or more of the following drills (adopted from **Keyboarding Curriculum Guidelines**, WA, 1991):

- concentration drills stressing long, unfamiliar words
- double letter drills
- left-hand word drills
- right-hand word drills
- transposition drills
- adjacent key drills (a for s, m for n, etc.)
- opposite hand drills (i for e, etc.)
- weak finger drills
- difficult reach drills (n to u, m to y, etc.)
- alphabetic review and corrective drills

When using accuracy drills, stress error reduction and concentration, do not be overly concerned with speed, but do stress correct techniques.

29. Do not grade drill work. Make a record of its completion (**Keyboarding Curriculum Guidelines**, WA, 1991).

30. Encourage students to work toward their best rate unhampered by error limits. Students grow by succeeding, not by failing. Therefore, goals should be within the powers of the individual.

31. Provide students with samples of correctly keyed copy so they know the difference between correct and incorrect copy in their work.

32. Give students opportunities to judge their progress toward goals.

33. Help students set progressive goals. When students are encouraged to set short-term individual goals, productivity increased.

34. Provide individualized instruction when needed.

35. Provide exercises which permit individual and group remediation.

36. Keyboards should be readily available for students to use independently for practice and application of new skills they learn during instructional time.

    - Make a copy of an actual size keyboard for each student to use foR practice in learning key location at home.

37. Furniture and equipment should be adjustable to accommodate a range of student sizes and disabilities so that students may comfortably attain proper body position and posture for effective operation of keyboards.

38. Young children can learn to key by touch if their maturity level is at least that of an average third grader. The level of an individual's concentration appears to be a limiting factor. A short instructional period works well.

39. Have students key real words during first lesson in keyboarding to get them excited.

40. The goal for elementary keyboarding is a rate that is faster than average handwriting speed (7-10 wpm for grades 4-6) (Cameron, 1986). Third, fourth and fifth graders need 20-30 hours of instruction if they are to type as quickly as they can write by pencil.

41. Short 2, 3, and 4 letter words should be used in practice materials for initiating keyboard control. Balanced-hand words facilitate the development of good technique at the beginning.

42. Avoid talking too much. Students learn to type by typing, not listening to teachers talk about typing.

43. Positive motivation is most effective in skill building.

44. The student's efficiency of learning increases when they know their rate of progress. Each student should keep a record of their progress.

45. Repetition exercises should be meaningful and purposeful to the student. Effective lessons consist of varied activities. Give students appropriate practice and opportunities to use their keyboards for composition, spelling, short and long answer questions and homework.

46. Contests and competition are effective motivating devices. Self-competition and/or group competition should be used carefully so as not to hurt any student(s) feelings.

47. Provide frequent reviews and drills for numeric and symbolic keys as they are more difficult to control than letter keys.

48. For students who reach a skills plateau, try the following:

- time the student on familiar straight copy to push to a new speed rate
- use paragraphs of progressive length
- talk to student to identify individual problems or difficulties

Students need to be pushed beyond their level of control, even if they make errors. After they physically learn to type faster, they can drop their speed and improve accuracy.

49. When evaluating keyboarding skills, common errors may include:

- striking the adjacent key,
- striking the home key instead of the key above or below,
- a general confusion in the use of vowels,
- stroking technique, or
- following directions.

50. The best motivation is an enthusiastic teacher!

Keyboarding Technique

1. Encourage students to relax their arms. Set up a situation in which students purposely tense their muscles in the forearms and move their fingers. Have them relax and move their fingers so that they can feel how fast and easy it is to move their fingers once the muscles are relaxed.

2. Have students type with their elbows out at an extreme angle to the keyboard so that they can see what happens to their finger placement.

3. Explain to the students that looking at the keys is a substitute for learning.

4. Have students touch keys with their eyes closed.

5. Key with fingertips.

6. Strike and release keys quickly Quiet hands; don't let hands bounce.

7. Stress the importance of mind set. Students should be relaxed and feel that they will be successful. Daily keyboarding warmups, which are short, help build confidence and establish mind set for the keyboarding class.

8. Stress the importance of the home-row keys and keeping fingers curved and upright in the home-row position.

9. Help students develop good eye-copy habits and concentration. Have them type a sentence letter-by-letter from the period backwards to the beginning.

10. Do not stress accuracy too early, as students will tend to build delayed response patterns between seeing letters or words and striking appropriate keys. **Stress the development of technique first, speed and then accuracy.**

11. It is easier to form good habits from the start than to break bad habits once they are formed.

12. Have students use *anchors* to identify which fingers stay on the home row as a reach is made for every letter or number.

13. To develop speed with control, the student must learn efficient reach patterns. The location of the key must be a pattern of reach and feel.

14. Use speed forcing techniques such as pacing to develop optimal speed, to develop stroking, and to break any keyboard watching habits that persist.

15. Allow students a high error rate to encourage continuous keying without error correction. This increases potential keyboarding speed and allows students to achieve speed goals without using the correction key. Students also have visual proof of the incorrect reaches that need remedial drill and practice.

16. Develop rhythm by focusing on techniques that encourage the use of optimal speed.

17. Technique should be stressed daily when learning keyboarding.

18. Students will place the same amount of emphasis on technique that is monitored and evaluated on a regular basis.

19. Explain to the students that when a person types 60 words per minute, they are making 5 strokes per second. Keeping feet flat on the floor helps maintain proper balance to give the precision needed to make the strokes properly and keyboard without errors.

20. Use creative methods to remediate problems with technique.

    - To break the habit of resting the palm on the keyboard, tape a ball of paper underneath the hand at the correct height. You might also physically raise (with a pointer, ruler, hand, etc.) the student's wrists.
    - To encourage students to use fast, snappy strokes tell them to pretend that the keys are hot.
    - To stop movement of the wrist, place a coin on the student's wrist, requesting that they keyboard without letting the coin fall.
    - To help students locate or maintain finger placement on home keys, provide visual or tactile cueing, such as coloring each home key or placing a small raised dot on each home key.
    - Provide a visual model that is enlarged or close at hand for students who have visual impairments or who have difficulty staying on task.

21. Use practice materials encountered in the real world: handwritten, typed drafts, and composition to develop competency beyond introductory lessons.

22. Strive for speed with control.

23. Do daily exercises with students to relax shoulders, arms, wrists, hands and fingers at the beginning of each class. Students should be encouraged to use these exercises as needed during their class practice.

24. Constantly say aloud: *Eyes on Copy.*

25. Proofreading is an essential foundation skill.

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GLOSSARY

ACCESS: To retrieve information from a storage place in the computer system; to enter and use.

ACCURACY: Degree of freedom from errors

ALPHA-NUMERIC: Referring to data that consists of numbers and alphabetic characters.

BACKSPACE: To move the cursor to the left one space at a time by striking the backspace key or back arrow key

BASIC: (Beginners All-purpose Symbolic Instruction Code) One of the easier computer languages to learn. It is now a popular language used with personal computers.

BAUD: A measurement of data transmission rates expressed as " bits per second" or bps. Abbreviation of Baudot.

BIT: A binary digit, 1 or 0. The smallest amount of information that a computer can interpret.

BOOT: Getting the computer system running from a cold start or bringing up a program; loading a program or software application.

BUFFER: An area of storage used to temporarily hold data being transferred from one device to another.

BUG: An error. A hardware "bug" is a physical or electrical malfunction or design error. A software "bug" is an error in the programming logic.

BYTE: It is a basic measure of computer memory. A byte is usually comprised of eight bits. A single, alpha-numeric character can be stored in one byte.

CAPABILITIES: Functions that can be performed by a computer system.

CATHODE-RAY TUBE (CRT):
TV-like screen for displaying data.

CD-I: Compact Disk, Interactive. A technology that combines the capabilities of the CD-ROM disk with TV to provide audio, graphics, animation and full-motion video.

CD-ROM: Compact Disk, Read Only Memory. An optical disk storage system that uses optical disks that have already had information written on them.

CENTRAL PROCESSING UNIT (CPU):
The part of the computer that performs all the operations of the computer such as manipulation, arithmetic, interpretation, and execution of instructions; the brains of an electronic computer system.

CHARACTER:
Any symbol which has a specific meaning to someone. Characters may be represented by letters, numbers, and other symbols such as punctuation marks.

CHIP: A piece of semiconductor material with inscribed circuitry that contains the basic memory and logic of a computer. It is usually made of silicon and is less than 1/4 inch square and 1/100 inch thick.

CLIPBOARD: An area of memory that holds data that is being copied from one application to another.

COMMAND: An instruction that tells the computer to do something, such as to run a program.

COMPATIBILITY:
The ability of one type of computer system to share information or to communicate with another type of computer system.

COMPUTER: A machine that carries out logical operations by transforming data received and stored into electrical impulses and then acts in a predetermined and predictable fashion.

COMPUTER-AIDED INSTRUCTION:
Learning aids that allow a student to learn at their own pace and provide immediate feedback.

COMPUTER GAMES:
Computer programs designed for educational and recreational purposes involving interaction between the player and computer.

COMPUTER PROGRAM:
A set of instructions which directs a computer to perform a sequence or series of tasks in order to produce a desired output.

CONTROL KEY:
Special key used in combination with other keys to perform a special function.

CURSOR: A dot, line, or square of light that shows the point on a screen where an entry will occur; a visual position indicator that moves along with each characters as it is entered from the keyboard.

DATA: The numbers, facts, concepts, etc. to be processed by a program—although any information input to a computer system is considered data.

DATABASE: Related items maintained in a computer file.

DATA ENTRY:
The process of entering information directly into a computer system.

DEBUG: To test a program to determine if it works properly.

DELETE: To remove a character, word, line, phrase, or page(s) from text and display screen.

DESKTOP PUBLISHING:
The use of the computer to produce an original layout for material to be printed.

DISK/DISKETTE:

Small circular flexible or hard cased plastic used to store information when using minicomputers. A flexible diskette is called *floppy*. A diskette that can be turned over to use the other side is a *flippy*. A *hard disk* has a rigid platter in place of the flexible plastic of a floppy. The rigid shape allows more precise data recording, and has higher density and more capacity. IBM terminology for hard disks in their personal computers is called *fixed disks*; everyone else calls them *hard disks* or *hard files*.

Diskettes for personal computers may be 5 1/4" or 3 1/2" across. Advanced technology has made is possible to store more information on a standard-sized disk called *high capacity* diskettes.

DISK DRIVE: The most commonly used auxiliary storage device which stores data by magnetically recording it on the surface of a rotating disk.

DISPLAY UNIT:

A device, such as a video screen or cathode ray tube (CRT), that lets you see the data or information in computer system.

DOCUMENT: Original source from which input is entered or output created after the input has been processed.

DOCUMENTATION:

The user's instructions that accompany microcomputer hardware and software.

DOS: Disk operating system.

DOT-MATRIX CHARACTER:

A printed character formed of dots so close together that it gives the impression of having been printed by uninterrupted strokes.

DVORAK KEYBOARD:

A keyboard design that has all vowels on the left side of the home row and the most commonly used consonants on the right side of the home row.

EDITING: The process of making changes or corrections in text.

ELECTRONIC MAIL: The transmission of messages, documents, or other information from one computer user to another via the computer.

ENTER: To input keystrokes.

ERROR: Any misstroke of a key.

ESCAPE KEY: A key on some computers to allow the user to move from one segment of a program to another.

FILE: A collection of logically related records dealt with as a unit.

FIRMWARE: Programs or data stored in memory (ROM) built into the computer. It is either built-in by the manufacturer, or added with a cartridge and cannot be changed by the user.

FORMATTING: The arrangement, spacing and placing of copy according to accepted conventions for specific documents.

FRIENDLY (USER FRIENDLY): A term used to describe computer hardware and software which is easy to understand and use, even by beginners.

FUNCTION KEYS: Special keys when used alone or in combination with other keys perform special functions such as setting margins, centering copy, printing, etc.

GIGO: Garbage In, Garbage Out—an expression used to describe a poor program or when inappropriate data is inputted.

GLOBAL SEARCH: Computer goes through a document to find a word or phrase.

GRAPHICS: A visual display of information in the shape of lines and other geometric designs; graphs, charts, diagrams, art, pictures.

GWAM: Gross words a minute; a measure of the rate of keyboarding speed; equals total of each 5 strokes keyed divided by the time required to key or type those words.

HARD COPY: Computer printout on paper that can be read and handled by people.

HARD RETURN: Using return or enter key at end of line to wrap or scroll.

HARDWARE: The physical equipment of a computer system.

ICON: A picture or graphic symbol use on the screen to represent an action that can be taken.

INFORMATION PROCESSING: All the steps involved in completing a communication on electronic media: input, processing, output, editing, revising, distributing and storing in memory.

INK-JET PRINTER: A printer that sprays electrically charged ink onto paper in the form of the characters to be printed.

INPUT: The process of entering information/data on a keyboard.

INSERT: To add information to existing text.

INTERFACE: Connection between any two elements in a computer system. Used for the connection between hardware and software.

JOYSTICK: Device connected to a base that allows movement of an object on a computer screen in all directions (like a mouse).

KEYBOARD: The arrangement of the alphabetic, numeric, symbolic and function keys on a typewriter or computer keyboard.

KEYBOARDING: The manipulative skill for using a keyboard.

K (KILO): Abbreviation denoting 1, 024 bytes or 1,000 characters; memory capability.

LANGUAGE: A computer language is a code which both a programmer and the computer understand. The computer is told what to do in this code, and the computer understands, and performs the task.

LASER PRINTER:
Computer-driven photocopier; a printer that uses toner to print an entire page at a time, works like a copier.

LETTER QUALITY PRINTER:
A high quality printer that produces a print quality equal to that of a typewriter.

LOCAL AREA NETWORK:
A network of computers within the same building that can share accessories such as printers and storage devices.

MAGNETIC MEDIA:
Plastic tape, chips and other devices used to store data for computer input. Data is written in the form of magnetized specks that the computer can read.

MEGABYTE: A measure of computer memory. Means a "Big" byte. A megabyte is comprised of a million bytes.

MEMORY: A portion of the computer that stores data which has been entered; this data is saved, and can be retrieved at a later time.

MENU: A list of options from which a computer user may select. The menu is usually displayed on a CRT screen. Often a component of user friendly programs.

MICROCOMPUTER:
A small, personal computer. Examples are Apple, Macintosh, Compaq or an IBM Personal Computer.

MICROPROCESSOR:
The electronic components of an entire single processor unit created on a very small single silicon chip.

MINICOMPUTER:
A mid-sized computer capable of serving several users at the same time.

MODEM: A device that makes it possible to transmit and receive computer data over telephone lines. Data is converted from a form which is compatible with data processing equipment to a form which is compatible with transmission facilities, and vice versa.

MONITOR: A device for visually displaying a computer program or the results of that program on a screen.

MOUSE: An input device which when rolled about a surface sends signals to the computer to move a cursor or object on the screen.

NETWORK: A system composed of one or more connected computers and terminals and related devices; local area network.

NUMERIC KEYPAD:
The placement of number keys on some keyboards in an arrangement similar to a 10-key calculator.

NUM LOCK:
A key which works similar to a Caps Lock key which allows numbers only to be used on a numeric pad when the numeric pad has another function as well.

OPERATING SYSTEM:
A program that supervises and controls the operation of a computer. Operating systems are complex and consist of many parts.

OUTPUT: Information that comes out of a computer or a data processing system; printed material.

PACE: The rate of speed at which keystrokes are made on a keyboard.

PERIPHERALS:
Any additional equipment distinct from the central processing unit (CPU). The equipment may provide the computer system with outside communications capabilities.

PRINTER: An output device that converts electronic signals from the computer into human-readable form or hard copy.

PROGRAM: A written set of instructions designed to make a computer perform a specific task or to solve a particular problem.

PROOFREAD: To read and review copy on a display screen or print-out for errors compared to the original document.

QWERTY KEYBOARD:
The most commonly found keyboard design which gets its name from the first six letters of the top alphabetic row on the keyboard.

RAM: (Random Access Memory) A memory device in which information is stored temporarily and can be changed.

RETRIEVE: To bring up stored information or a program on a computer.

RETURN: (or enter) To strike the return key to cause the cursor to move to the left margin and down a line to the next line; to enter information.

ROM: (Read-Only Memory) A memory device in which information is stored permanently and cannot be changed or erased.

SAVE: To store information from memory on tape or disc so that it can be used again.

SCROLL: To move a video display up or down, line by line, or side by side, character by character.

SOFTWARE: Programs and other documentation used to operate the computer system.

STATE OF THE ART:
Technologically-advanced.

STORAGE DEVICE:
Any various devices capable of retaining data for relatively long periods of time, such as a punch card, disk or tape.

STORE: To save information on magnetic media.

SYSTEM: A series of related data processing procedures designed to perform a specific task.

TERMINAL: A hardware device within a system that can be used to enter, retrieve, and display information.

WRITE: The opposite of read. To transfer information from the computer's memory to a storage device such as a disk.

WORD PROCESSING:
The system of preparing documents and writing and storing documents on a computer or word processor.

WRAPAROUND:
A process whereby a system adjusts margins automatically without the operator pressing a return key or an enter key.

RESOURCES

Resource Libraries

Alaska Vocational Materials Library
Office of Adult and Vocational Education
Alaska Department of Education
PO Box F
Juneau, AK 99811
(907)465-2980

- Business Education Curriculum
- Business Education Resources
- Curricula and instructional materials for all vocational areas including Business and Office. Resources are loaned for a 2 month review period. Catalog is computerized and maintained on Appleworks software. May be obtained by request.

Northwestern Vocational Curriculum
Coordination Center
St. Martin's College
Lacey, WA 98503
(206)438-4456

- 10-state regional library of vocational materials. May be accessed through Alaska Vocational Materials Library.

Keyboarding Curriculum/Texts

The following resources are a sampling of the curriculum/texts available from publishers and have not been formally reviewed nor approved by the Department of Education. Teachers are encouraged to preview materials before using them in the classroom.

Alphabetic and Numeric Keyboarding, South-Western Publishing

Basic Keyboarding and Formatting, second edition, South-Western Publishing, 1989

Century 21 Keyboarding, Formatting and Document Processing, 4th edition, South-Western Publishing, 1987

Computer Keyboarding: An Elementary Course, by T. J. Crawford, L.W. Erickson, L.R. Beaumont, J.W. Robinson, and A.C. Ownby, South-Western Publishing Company, 1985

Cortez Peters Championship Keyboarding, Skillbuilding and Applications, Gregg Division, McGraw-Hill Publishing Company, 1989

Electronic Keyboarding: Standards for Grading Timed Writings, by B. June Schmidt and Clarence D. White, National Business Education Association

Elementary Keyboarding,Gregg Division, McGraw-Hill Publishing Company, 1986

Gregg Keyboarding and Personal Applications, Gregg Division, McGraw-Hill Publishing Company, 1987

Gregg Typing: Basic/Refresher: A Gregg Text/Kit in Continuing/Adult Education, third edition, Gregg Division, McGraw-Hill Publishing Company, 1988

Keyboarding for Everyone by Gary N. McLean, Leslie J. Davison, and Otto Santos, Jr., Anaheim Publishing Company, 1984

Keyboarding for Information Processing, 2nd edition, Gregg Division, McGraw-Hill Publishing Company, 1987

Keyboarding, Gregg Division, McGraw-Hill Publishing Company, 1985

Keyboarding Skillbuilder, Glencoe/McGraw-Hill Publishing

Keyboarding/Typewriting for Personal Applications, fifth edition, South-Western Publishing, 1986

Keyboarding/Typewriting-Introductory, Intermediate, Advanced, fifth edition, South-Western Publishing, 1991

Professional and Personal Keyboarding and Typewriting, sixth edition, South-Western Publishing, 1988

Typewriting: Learning and Instruction, South-Western Publishing, 1979

Keyboarding Software

The following resources are a sampling of the software available and have not been formally reviewed nor approved by the Department of Education. Teachers are encouraged to preview software before using them in the classroom.

Buzzell's Typing Program, BEP Company, 4523 Riverside Drive, Juneau, AK 99801, 907-789-2230

Drill and Practice Software, Glencoe/McGraw-Hill Publishing Company

I Can Type, elementary keyboarding instruction, Glencoe/McGraw-Hill Publishing Company

Keyboarding Capers, elementary keyboarding instruction, MPC Education Publishers

Mavis Beacon Teaches Typing!, 1987, The Software Toolworks, One Toolworks Plaza, 13557 Ventura Blvd, Sherman Oaks, CA 91423, 818-907-6789

Microcomputer Keyboarding, Alphabetic Keyboarding, South-Western Publishing Company, 5101 Madison Road, Cincinnati, OH 45227

Micronumerics, Applications and Exercises, Glencoe/McGraw-Hill Publishing Company (Ten-Key Numeric Pad Instruction and Skill Development)

Micropace (timed writing software), South-Western Publishing Company

MicroPAWS, elementary keyboarding instruction, South Western Publishing Company

Pacing Software for Progressive Typewriting Speed Practice, Gregg Division, McGraw-Hill Publishing Company, 1988

Skillbuilding: Building Speed and Accuracy on the Computer Keyboard, by Eide, Homes, Klemin, Gregg Division, McGraw-Hill Publishing Company, 1988

Smartype-A Keyboarding Program, Colette Daiute, Gregg Division, McGraw-Hill Publishing Company, 1986

Ten-Key Trainer, Glencoe/McGraw-Hill Publishing Company

Timed Writing Software, Glencoe/McGraw-Hill Publishing Company

Type Right, Basic Keyboarding, Business Keyboarding, Advanced Keyboarding, Adventures in Keyboard Land, 1986, Career Publishing Inc, 910 Main Street, PO Box 5486, Orange, CA 92667, 1-800-854-4014

Type-Rights, an inexpensive lap-top computer dedicated to teaching keyboarding, Video Technology Industries, Inc., 380 Palatine Road, Wheeling, IL 60090, 708-215-9700. A manual for teaching with these keyboards is available from Dr. Cathy Carney, Office of Basic Education, Alaska Department of Education, PO Box F, Juneau, AK 99811, 907-465-2841.

Typing Tutor IV, 1987, Kriya Systems, Inc., Sterling, VA, published by Simon and Schuster.

Publishers

Allyn and Bacon, Inc.
470 Atlantic Avenue
Boston, MA 02210

Anaheim Publishing Company
2632 Saturn Street
Brea, CA 92621

Artistic Typing Headquarters
Teaching Aids Division
3200 Southgreen Road
Baltimore, MD 21207

Bobbs-Merrill Company, Inc.
4300 West 62nd Street
P.O. Box 7080
Indianapolis, IN 46206

Career Aids, Inc.
20417 Nordhoff Street, Dept S.
Chatsworth, CA 91311
(818)341-8200

Coronet Films
65 E. South Water Street
Chicago, IL 60601

Delmar Publishers
PO Box 15-015
Albany, NY 12212

Dictation Disc Company
240 Madison Avenue
New York, NY 10016

Forkner Publishing Corp.
P.O. Box 652 Service Code WO
Ridgewood, NJ 07451

Gregg-Division
McGraw Hill Book Company
Western Regional Office
8171 Redwood Highway
Novato, CA 94945
1-800-334-7344
415-897-5201

Harcourt Brace Jovanovich, Inc.
6277 Sea Harbor Drive
Orlando, FL 32821

National Business Education Association
1914 Association Drive
Reston, VA 22091-1596
703-860-8300

Harper and Row
10 East 53rd Street
New York, NY 10022

Houghton Mifflin Company
777 California Avenue
Palo Alto, CA 94304

H.M. Rowe Company
624 North Bilmore Street
Baltimore, MD 21217

John Wiley and Sons
605 Third Avenue
New York, NY 10016

Milady Publishing Corp.
3869 White Plains Road
Bronx, NY 10467

MPC Educational Publishers
3839 White Plains Road
Bronx, NY 10467

Cortez W. Peters, Jr.
4556 Argyle Terrace N.W.
Washington, DC 20011

Pitman Learning, Inc.
Six Davis Drive
Belmont, CA 94002

Prentice-Hall Media
150 White Plains Road
Tarrytown, NY 10591

Society of Visual Education
1345 Diversey Parkway
Chicago, IL 60614

South-Western Publishing Co.
6185 Industrial Way
Livermore, CA 94550
415-449-2280
1-800-543-7972

Words, Inc.
Box 8571
Univ. of Tennessee Station
Knoxville, TN

J. Weston Walch
P.O. Box 658
Portland, MN 04104
1-800-341-6094

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