DOCUMENT RESUME

ED 403 379 CE 065 149

AUTHOR Gordon, Edward E.; Askov, Eunice N.
TITLE Workforce Education: Improving Educational Skills. Practical Guidelines for Training and Development Professionals. Business Basics.
INSTITUTION American Society for Training and Development, Alexandria, VA.
REPORT NO ISSN-8755-9269
PUB DATE Oct 93
NOTE 26p.
AVAILABLE FROM American Society for Training and Development, P.O. Box 1443, Alexandria, VA 22313-2043 (1-4 copies, $10 each; 5-9, $8.50 each; 10 or more, $7 each).
PUB TYPE Collected Works - Serials (022) -- Information Analyses (070)
JOURNAL CIT INFO-LINE; iss 9310 Oct 1993

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Adult Education; Basic Skills; Case Studies; *Computer Assisted Instruction; *Corporate Education; Courseware; *Labor Force Development; *Literacy Education; Program Development; *Training Methods; *Workplace Literacy

ABSTRACT

This booklet, which is designed as a how-to guide for training and development professionals, contains guidelines for developing and implementing work force education programs that include education, skills and training components. The rationale for work force education is presented. The general characteristics and limitations of existing programs are examined. Discussed in a section on corporate literacy programs are book and paper/pencil programs and common problems in corporate programs. Case studies of existing work force education programs for managers/professionals and production, technical, service, and office support employees at U.S. companies are presented. Presented next are some general training concepts that emerge from the case studies in relation to the following topics: time, application of new learning to existing knowledge, continuous feedback and assessment, metacognition (learning how to learn), and motivation. General guidelines for developing computer-based work force education programs are presented along with an index of workplace and adult basic skills software. Lists of 37 software publisher/distributors and 18 recommended articles/books are provided. Concluding the booklet is a list of eight best training practices. (MN)

INFO-LINE

Practical Guidelines for Training and Development Professionals

Workforce Education: Improving Educational Skills

ASTD
American Society for Training and Development

October 1993
Issue 9310

Business Basics

If you think education is expensive, try ignorance.

Derek Bok

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UPCOMING *INFO-LINE* ISSUES:

- Leadership
- Needs Assessment
- Relationship Consulting

Issue number 9310.

Printed in the United States of America.

INFO-LINE is a series of practical booklets published monthly by the American Society for Training and Development, offering useful, how-to information for training and development professionals.

INFO-LINE is available by subscription, and single copies may be purchased. Please refer to the order form at the back of this issue.

ASTD
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INFO-LINE (ISSN 87559269) is published monthly for $79 (for ASTD National members) and $119 (for nonmembers) for 12 issues by the American Society for Training and Development, P.O. Box 1443, Alexandria, VA 22313-2043. Second-class postage paid at Alexandria, VA. POSTMASTER: Send address changes to *INFO-LINE*, P.O. Box 1443, Alexandria, VA 22313-2043.

Why Workforce Education?

- "We have workers who come here after working in the fields who are now sitting at computers." —Training Manager

- "I was scared to take the math course at first, but now I'm ready to learn. I wanted to do this for myself, to build my confidence and learn something new that can help me. I'll be working on a work team later in the year, so I hope to take the communication skill course as well." —Trainee

- "Our company enrolled all employees in quality training programs. They read quality. At every opportunity, I talked to them about quality. I finally realized that after all this effort and cost, many people don't comprehend what we're saying!" —President, mid-sized manufacturing company.

These three personal perspectives lead to both hopeful or pessimistic conclusions regarding the American worker. As the U.S. economy approaches the 21st century, it will become increasingly high tech and driven by intense international competition. The majority of new jobs created in this evolutionary job environment will require some post-secondary education for the first time in our nation's history.

By the year 2000, according to U.S. Department of Labor estimates, only 27 percent of all new jobs will fall into low-skill categories. This compares to 40 percent today. Why? Existing jobs are being permanently wiped out through computerization, improved machinery, and new ways of organizing work.

The equally bad news for many employers is that a substantial demographic shift has taken place, as many uneducated recent immigrants and ill-educated minority-group members and women compose a larger percentage of the national labor force. (Unfortunately, the education system doesn't serve minority-group members or women as well as white males.) From 1986 to 2000, only 9 percent of labor-force growth will be white males, and 56 percent will be minorities. By the year 2000, four of every five workers will be from minority groups.

So what? The previously mentioned manufacturing plant president must employ these same people in his quality program. This presents management with a major problem. In a quality program comparison of Crosby's 14 steps, Deming's 14 points, and Juran's 7 points, we find the requirement that training promote employee problem solving on the job. All three quality gurus call for empowered work teams to make decisions, analyze systems, investigate, invent new processes, classify, compare, and generally manipulate information. Increasing personal creativity has become the name of the game for American business.

Your company's strategic plan needs to consider workforce education to build your total workforce's skills. In many instances, a company may be far behind its foreign or domestic competitors in the skills, training, and education its people need for an ultra-modern workplace.

Workforce education goes far beyond basic skills or literacy. It is a new paradigm that is part of a triad of skills, training, and education. (See Figure 1.) Companies will continue to offer training in such areas as basic management, supervision, service, and assembly behaviors. We will discuss how companies can successfully add an additional skill component that increases overall employee comprehension in such areas as writing, math, reading, foreign languages, and English-as-a-second-language (ESL). Only after addressing these two employee-development areas will a business be able to address successfully the education issues of building higher-level thinking skills for TQM, ISO 9000, work teams, problem solving, personal creativity, and advanced technical or professional education.

The skills component of this Work Force Education Triad™ has many potential solutions. This *INFO-LINE* will examine these alternatives and the current best-training practices that are beginning to be discovered.

We are shut up in schools and college recitation rooms for 10 or 15 years, and come out at last with a bellyful of words and do not know a thing.

Ralph Waldo Emerson

The Search for Solutions

Workforce education has long been the "poor man" of corporate training and the "stepchild" of the American educational system. Born in adversity and mired in political controversy, workforce education until now has remained isolated from the mainstream of business training and development.

Before 1980, workforce education was not a popular training issue. Most businesses vehemently denied that any managers or workers experienced this problem. They seldom considered any in-house education solutions. Beginning in the early 1980s, some businesses began using computer-based training and classroom instruction to raise education skill levels.

Workforce education programs are now being sponsored by such corporations as Polaroid, Motorola, Allstate, Hewlett Packard, Quaker Oats, Inland Steel, General Motors, Ford, Chrysler (in cooperation with the United Auto Workers union), and the International Ladies' Garment Workers Union, among others. However, few large corporations offer such programs at every plant or office location. Most local programs are funded by regional, state, or federal literacy grants. Very little financial support comes from their own training and development budgets. Workforce education remains the poor stepchild of business.

In addition, many companies are offering basic literacy training for their employees through programs conducted by Laubach Literacy Action and Literacy Volunteers of America. These nonprofit organizations use thousands of volunteers across America to provide basic literacy training either through one-on-one instruction or in small tutorial groups. They publish their own materials and offer training for the volunteers. Some on-site company programs use materials adapted for the workplace.

One limitation of these programs is the absence of diagnostic procedures to determine learning disabilities, such as dyslexia. Another is that they are dependent on volunteers, whose initial training is often minimal. And few of these programs have the benefit of ongoing training or consulting help from professional adult educators and training specialists. Such help is desperately needed by most community-based, nonprofit programs to improve instructional quality.

Corporate Literacy Programs

BOOKS AND PAPER/PENCIL PROGRAMS

The primary materials used in workforce education programs tend to be print, including workbooks and paper-and-pencil activities. Several publishers offer such materials. One such program is Simon & Schuster's *Literacy at Work: The Workbook for Program Developers.* This program features a train-the-trainer approach and is designed to help instructional personnel adapt generic written materials for specific workplace applications. This approach appeals to small- and medium-sized companies since the investment is less than purchasing computer hardware and software. Print materials can also be expanded, adapted, and updated more easily than computer software.

Many factors go into the selection of materials for and approaches to workforce education. Variety is needed to serve groups of workers with different skill levels and different needs. Both research and trainers' experiences confirm that workforce education training methods in descending order of effectiveness are—

- Mastery learning (particularly a small-group-tutorial model)
- Cross-training (peer tutoring)
- Computer-based training (for higher-skilled adults)
- Programmed learning (for independent learners)
- Traditional classroom instruction.

"Whom are you?" said he, for he had been to night school.

George Ade

COMMON PROBLEMS IN CORPORATE PROGRAMS

Many corporate training programs fail because they subject adults to the same conditions that caused them to fail in school. Typically, classes are too large, making individualized instruction difficult. Little effort is made to adapt commercial products or modify teaching methods to address specific worker-learning problems. Many of these adults bring to the workplace a history of undiagnosed learning problems.

The majority of these programs typically experience high dropout rates (at least 50 percent). Employees see little correlation between training activities and their job needs. Instructional materials are often inappropriate for the workplace; instruction is "lock-step" rather than individualized to meet the adults' particular learning needs.

Findings from current and emerging research suggest that the behaviorist traditions that permeate much of current adult training provides an inadequate design for the increasing demands made by more sophisticated workplace environments. New approaches to training and development are needed since complex tactical and strategic tasks now require assimilation of large amounts of new knowledge and high work-load requirements.

Outmoded, fixed assembly-line sequences relied heavily on employee psychomotor skills. Now productivity demands innovative workforce education that fosters better universal-worker thinking skills. Brains have become more valuable than brawn.

The fallacy of too many corporate workforce education programs is the assumption that workers already know how to learn new skills and then apply them on the job. To be effective, workforce education programs must first diagnose learning strengths and weaknesses. This means asking specific questions and gathering anecdotal information about each adult learner. From this information will emerge a picture of the adult's learning needs, interests, and personal goals. The instructor uses this information to adapt instructional content and teaching methods to show the adult how to learn and apply what has been learned. The nature of these new training approaches is emerging as a growing area of research and interest in business and industry.

Case Studies

MANAGERS/PROFESSIONALS

Price Waterhouse, a "big six" accounting firm, offers its CPAs an advanced writing course. Individual CPAs are trained by a writing specialist with a background in financial reports. The one-on-one tutorial was conducted on site, with two 60-minute classes held each week for 10 weeks. The key element in the training is for the executive to practice, not listen to a lecture about good writing habits.

An individual CPA's written reports are studied by the trainer prior to the program. The accounting firm selected specific examples of "model" letters as course goals. These documents paralleled the firm's management perspective, tone, and accounting philosophy. These training modules are designed to diagnose specific writing weaknesses and promote individual skill improvements to attain the firm's writing standards. Allowances are made for the individual writing style of the CPA.

This advanced workforce education program is used to meet individual needs for Continuing Personal Education (CPE) identified by Price Waterhouse.

I think the world is run by C students.

Al McGuire

PRODUCTION EMPLOYEES

Clorox's Chicago suburban plant employs approximately 100 hourly workers and managers. Clorox distributes its household products through such plants strategically located throughout the U.S. Each location assembles a finished product from raw materials delivered at each site. Local manufacturing and product testing have become much more sophisticated during the last decade. In response to Workforce 2000 and declining demographics, Clorox is attempting to upgrade its workers' skills for the future introduction of high-tech manufacturing/assembly equipment.

Clorox began its voluntary workforce education program with several orientation sessions announcing the availability of classes, their content, and answering specific employee questions. The company paid for the entire program. Employees attended small-group classes after or before their work shift. A two-hour class was held on site twice a week, for a period of 10 weeks, totalling 40 hours of training.

Clorox formed two classes of five workers each. Initial testing showed that individual educational skills in reading and math ranged from pre-reading to the fourth-grade level. Some adults had significant learning disabilities that prevented their success in school. Once their disabilities were identified, these workers were capable of rapid skill growth and information retention. Overall, worker achievement averaged 12 months of skill growth over the 10-week training period.

The trainers surveyed supervisors at the end of the class to determine if the employees' job performance had improved during the program and to increase their awareness that the workforce education program was making a noticeable difference in daily work patterns. The supervisors reported that among those workers who participated in the program—

- Production errors dropped.
- Interest in advancing to more complex jobs increased.
- Job problem-solving and trouble-shooting skills increased.
- Personal job motivation improved.

TECHNICAL EMPLOYEES

As with Clorox and many other U.S. manufacturers, Nabisco has many workers who are unprepared for the technological changes in its plants. Nabisco is planning an expansion of its workforce education program as part of a planned five-year $500 million expansion and modernization of the world's largest bakery, located on Chicago's southwest side.

Included in the expansion is the installation of more advanced, computerized equipment. The plant's general manager estimates that most employee skills range from the third- to seventh-grade level. Nabisco needs to upgrade worker skills by at least two grade levels. To accomplish this, each trainee will receive 150 to 200 hours of workforce education over five years.

These plans represent an expansion of the plant's current workforce education program that offers reading, math, English-as-a-second-language, and basic computer training. Employees also are prepared to take the high school general equivalency exam (GED).

Nabisco's workforce education program will continue to expand to keep pace with its galloping technology. Employees will continue to upgrade their skills to operate sophisticated electronic control and sensing systems.

Soap and education are not as sudden as a massacre but they are more deadly in the long run.

Mark Twain

SERVICE EMPLOYEES

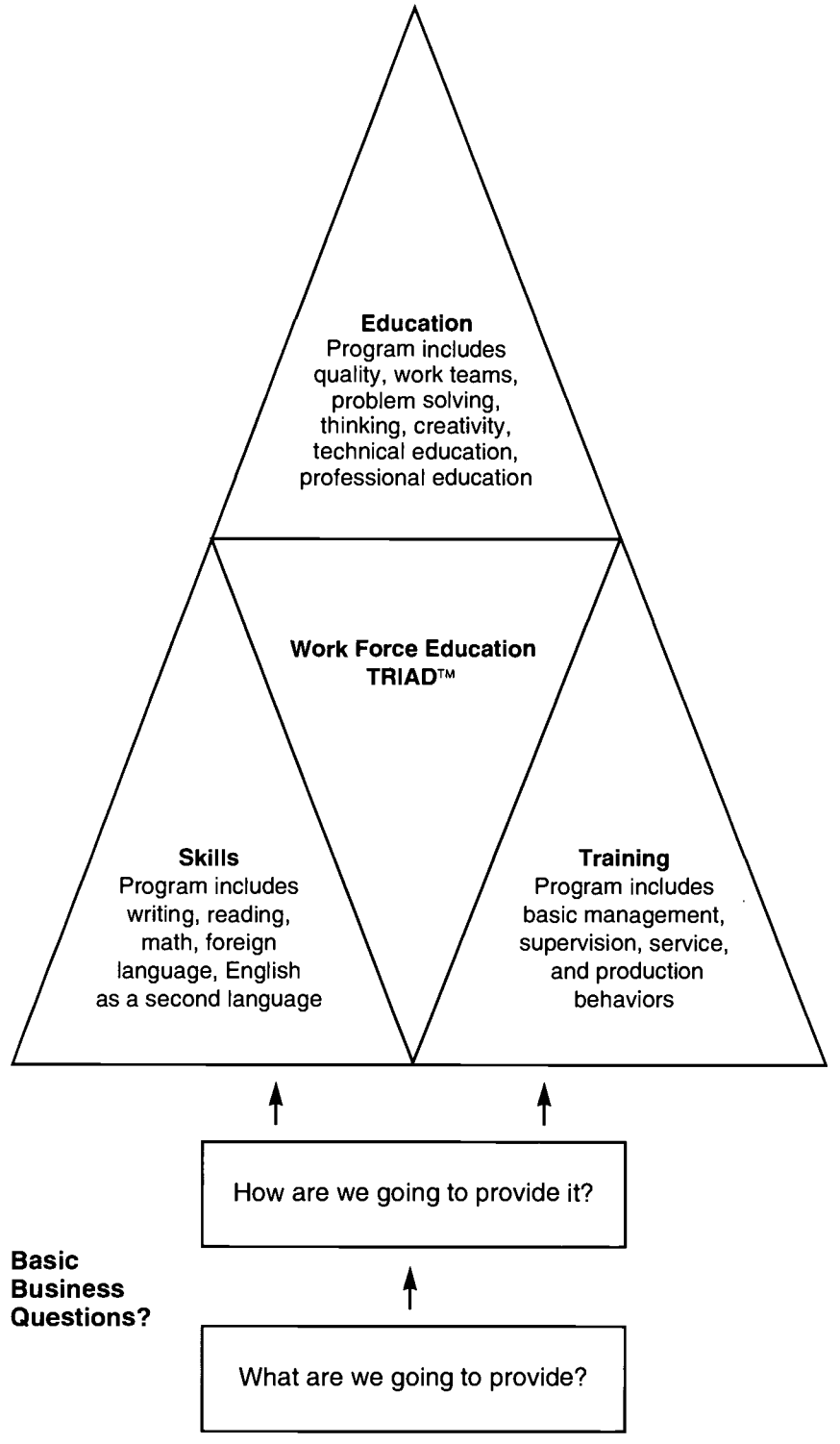
The Chicagoland Chamber of Commerce (CCC), a nonprofit, business-economic enhancement organization, provides workforce education company models for small- and medium-sized businesses. CCC piloted groups of workers and their companies for skills training through their on-the-job training programs. The Job Training Partnership Act (JTPA), which helps organizations hire and train economically disadvantaged adult workers, funds this program.

With Marriott, CCC trained housekeeping workers in basic reading and math. Another group of maids were enrolled in an English-as-a-second-language course. The small-group tutorial classes met on site for a 10-week period.

As a result of the training, daily newspapers became "user friendly" to the students. During class, they read help-wanted ads to learn about their job requirements and specifically about hotel positions that will become available to them as they become more skilled. CCC placed with a hotel because it provides good upward career ladders. However, without this workforce education program, students would not have known about higher-level jobs or how to apply for them.

CCC and the participating companies recognized the value of a one-to-one or small-group setting. These formats offered students participative learning methods that tailored the content to the individual student's best learning abilities. Even though these tutorial classes are more expensive when compared to traditional methods, the learning outcomes were far greater, with the corollary of a positive training experience that enhanced employee motivation.

FIGURE 1: WORKFORCE EDUCATION TRIAD



OFFICE SUPPORT EMPLOYEES

Organizations employ millions of office support workers who require skills at a high school level or above. Workforce education programs for office practices cover an array of business skills, including:

- Grammar
- Spelling
- Punctuation
- Proper business-letter forms
- Writing
- Speed typing
- Shorthand
- PC use and software.

Many secretaries are now called upon to assume managerial responsibilities. A newly promoted headquarters secretary found her duties now included writing interoffice memos. Her training included learning advanced vocabulary and the proper use of colons and semicolons. At the end of the one-on-one writing program, she was able to compose appropriately worded memos that were clear and concise.

Health-care and insurance organizations also use tutorial programs to improve accuracy and speed in patient data entry. Data-entry clerks have received PC training that taught them both PC usage and software capabilities. At a major insurance company, grammar and speech skills were improved by taping conversations and learning correct grammar through listening.

Lessons for Trainers

Several important factors have emerged from these case studies regarding workforce education. Some general training concepts that emerge from the case studies follow:

- **Time.**
  - —The amount of time that adult learners are actively engaged in a learning task is important.
  - —The performance of a task becomes more automatic with repeated exposure to small, meaningful task components consistently presented over a period of time.
  - —Learning is enhanced by instruction that breaks down complex tasks into small, meaningful components that are individually taught.
- **Applying new learning to existing knowledge.**
  - —Knowledge, from a cognitive perspective, is organized in schemas—hierarchical mind structures or networks of abstract concepts, components, and interrelationships. Increasing an individual's ability to develop more elaborate schemas, to access them more easily, and to systematize learning procedures will make learning easier for adult learners.
  - —Instruction that facilitates students' relating new information to old is useful. New information is more readily learned when it is organized and presented in a conceptual structure, using associations, advance organizers, topic headings, and mnemonics.
  - —Teach the prototype first (concepts, rules, principles), then variations, including real-world examples and applications. Students should see the alignment among goals, content, instruction, task, and evaluation.
- **Continuous feedback and assessment.**
  - —Research indicates that adult learning is enhanced by detailed and specific feedback, not only on the correctness of the responses, but also on the appropriateness of the strategies.
  - —Feedback is important not only on total performance, but also on specific task components, so that the learner can discover sources of error. Continuous assessment that is integrated with instruction enhances the learner's ability to identify useful problem-solving strategies.
  - —Individual or small-group tutorials feature both continuous feedback and assessment for the adult learner.
- **Metacognition: learning how to learn.**
  - —Research shows that effective learners use mental models to conceptualize their tasks. This process also includes methods for accomplishing the task and for developing relationships to other similar ideas. The best problem solvers develop a detailed mental representation of the problem before attempting its solution.

—Learners can be explicitly taught to use learning models and thinking skills. Find out from adult learners what models they already use every day. Learning is enhanced when these models are elaborated and refined through training.

—Task analysis enables learners to identify the development of individual learning models. In addition, using learners' existing models provides examples for adults to try back on the job.

- **Motivation.**

—Adult learners use two kinds of knowledge: task and motivational knowledge.

—Motivational knowledge influences learning involvement and stimulates how adults feel about the experience. Motivators include a stress-free learning environment, peer support, a business culture that emphasizes learning and work-related performance, easy program accessibility, a sense of oneness among participants, employer commitment to program success, and persistence.

Computer-based training (CBT) applications have become a major feature of some company-sponsored workforce education programs. The availability of new software appropriate for adult learners makes CBT an important component of a total training program. Interactive videodisc (IVD) also expands the application of CBT training with its combination of audio and still and motion pictures.

How widespread is the use of technology, specifically computers, in adult literacy programs in the U.S.? According to a 1992 survey by Penn State's Institute for the Study of Adult Literacy, the most frequently used technologies were—

- Print materials
- Computers
- Chalkboards
- Overhead projectors
- Videotapes
- Television.

Adult students reportedly used computers mostly to learn new material at their own pace. For this, they needed basic computer skills and were allowed to make decisions about the lesson, such as the amount of practice and review. Computers are also used for practice and reinforcement.

Computer-based instruction is becoming an important method of presenting training to adult students. The computer is particularly well suited to this function.

A two-year study by the congressional Office of Technology Assessment, *Adult Literacy and New Technologies*, concludes that computerized literacy training offers tremendous promise, but most adult literacy programs simply can't afford the technology.

"Technology offers creative opportunities to meet the unique and diverse needs of American adults with low literacy skills," OTA officials say. "However, the potential of technology is not being exploited... and significant barriers inhibit wider and more sophisticated uses of technology."

Each year more courseware becomes available; at the same time, the necessary hardware decreases in price, bringing computers into the range of many literacy providers. As more courseware becomes available, literacy providers need to evaluate the effectiveness and appropriateness of various packages for use in their own programs.

The Institute has prepared a matrix of potential adult software for workforce education programs. The numbers in the far-right column correspond to the numerical list of software publishers that follows the matrix. Penn State does not endorse any of these products but assembled the matrix for adult literacy practitioners. It was originally published by the *Journal of Reading* in March 1991.

The matrix offers some guidelines to use in selecting computer-based courseware for adults. These are just guidelines on evaluation; use them to create your own evaluation form for use when selecting programs.

The key to selecting good software is to determine your needs first and then select courseware that will fit those needs. Look for courseware that uses the computer as an appropriate tool and uses different instructional strategies based on course objectives. Be sure to include students from your intended audience in your evaluation; they can give valuable input into how effective the courseware is from the student's point of view.

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	Teacher/ Tutor Tools		Assessment & Skills								Content					Instruction Method				System Requirements						?
	Customize	Mini-authoring systems	Math	Reading/decoding & structural analysis	Reading/comprehension	Writing/grammar	Writing/composing	Vocabulary/spelling & meaning	Problem solving	Complete basic-skills program	General basic-skills content	Workplace basic skills	Job-domain related	Job search/career	ESL	Drill & practice	Tutorial	Simulation	Games & puzzles	Apple	IBM	Tandy	Commodore	TRS-80	Macintosh	Publisher/distributor
ABS										●	●						●			●	●	●				21
Adult Education-Math			●								●									●	●					4
Adult Education-Reading					●						●									●	●					4
Angling for Words in Bits and Bytes				△							●					●				●						2
Base										●	□									●	●					12
Basic Language Units: Parts of Speech						●					●									●	●	●				8
Basic Grammar Units: Sentences						●					●									●	●	●				8
Basic Math Competency Skill Building			●								●						●			●	●					11
Basic Skills in Math			●								●									●						5
Career Arithmetic			●									●								●				●		4
Computational SkillsProgram			●								●					●	●			●						17
Create Lessons	●																			●	●					16
Create Lessons-Advanced	●																			●						16
Create-Medalists	●										●									●	●					16

△ Teacher Required □ Basic Skills keyed to jobs, but content generic

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Crossword Magic	●							●												●	●		●			30
Diascriptive Language-Arts Development						●					●						●			●	●	●		●		11
Diascriptive I, II, III Reading					●			●			●									●	●	●	●	●		11
EA Core Vocabulary Worksheet Generator	●							●			●								●	●						11
ESL Writer	●						●								●					●	●	●				30
Exploring Career Options					●							●		●						●						29
E-Z Pilot II Authoring System		●																		●						16
Foreign Language Vocabulary Games	●							●			●				●				●	●	●					29
Game Power for Phonics, Plus				●				●			●				●				●	●	●		●	●		33
Gapper Reading Lab	●				●			●			●									●						13 39
Ideal Learning Curriculum										●	●									●						18
Improving Your Vocabulary Skills								●			●									●	●					29
Individual Study Center	●	●														●										35
Interpreting Graphs			●						●				●					●	●	●						6

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	Teacher/ Tutor Tools		Assessment & Skills								Content					Instruction Method				System Requirements						?
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Introduction to the Business Office													●							●						13
Keyboard Cadet													●							●	●					5
Key Game	◉							●			●					●				●			●	●		36
Language Arts: The Rules	●							●			●									●						27
LEA-1 Functional Lit.-Using Whole Language					●		●								●			●		●	●	●		●		36
Learning to Write						●					●				●					●	●					13
Learning Ways to Read Words	■			●				●							●		●			●	●				●	13
Letter Man													●						●	●	●					5
Lucky 7 Spelling Games	●							●			●								●	●	●					13 29
Lucky 7 Vocabulary Games	●							●			●								●	●	●					13
Make-A-Flash	●							●												●						36
Math Facts			●								●					●	●			●						27
Micro-Computer Simulations in Business													●							●	●	●		●		32
M_ss_ng L_nks	✳				●						●								●	✳	●	●	●	●		34

✳ Only customize Apple software ◉ Need extra utility link ■ Need extra management system

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Penn State Adult Lit. Courseware	▲							●			●					●			●	●						19
Prevocational Math Review			●									●				●	●				●	●				1
Project Star										●	●															16
Read-A-Logo								●			●				●					●						36
Rov-a-Bot									●				●							●						11
Rules of the Road								●				●								●						4
Skills Bank II										●	●									●	●					31
Spelling for Careers in Business								●				●								●						14
Soft Text: English						●					●									●						8
Soft Text: Math			●								●					●				●						8
Soft Text: Word Study								●			●									●						8
Square Pairs	●							●			●								●	●			●			30
Success With Writing							●											●		●	●					30

▲ Module 3 & 6 only

INDEX OF WORKPLACE AND ADULT BASIC SKILLS SOFTWARE

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Survival Reading Series					●						●									●	●					29
TAS		●																						●		35
Teacher Option Organizer		●						●												●						23
The Semantic Mapper		●						●							●					●				●		36
Tic Tac Spell	●							●			●								●	●						30
Time Master			●								●					●				●						24
Typing Keys to Computer Ease													●			●				●						2
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The following eight best training practices have been developed by research conducted by Imperial Corporate Training & Development:

√ Instruction needs to modify student attention, expectancies, and memory. Cognitive information processing is enhanced when learners are actively engaged in the learning task—discuss, rehearse, analyze, problem solve, use graphs to represent experience—and share observations, understandings, and knowledge.

√ Find out learning strengths and problems. Diagnose the adult's learning difficulties. This includes not only giving a normed pre- and post-test in reading, math, problem solving, grammar, writing, and other pertinent skills, but also making careful observations about potential learning difficulties and/or disabilities. Additional diagnostic tests should be used, if needed, to determine the direction of remedial training.

√ Use relevant adult training materials. Teaching materials must be realistic for each individual's present or future job requirements. The curriculum for a manager, secretary, or plant worker must be organized around actual job tasks. Training must be built on the employee's knowledge of job content. Include other non-job-related materials based on the employee's personal interests, hobbies, and daily needs. Seeing broader, immediate payoffs in daily life will sustain the individual's interest and motivation.

√ When possible, give employees an opportunity to work together and learn from each other. Social learning gives the adult an opportunity to imitate the successful learning behaviors of others.

√ Adult learners need constant feedback on their progress. When learning tasks are grouped into smaller segments, the trainer has the opportunity to give periodic progress reports to each adult learner. Verbal reports, progress charts, checklists, and certificates of completion are several techniques that can be adjusted for the intended audience.

√ Effective workforce education programs use an array of evaluation methods to improve content, training methods, and overall employee success. Standardized tests alone will not do the job. They may even give a false impression of skill needs or overall program results.

√ To lower dropout rates typically found in these programs, individual job goals and objectives must be clearly defined before employees enroll. While these issues may change once adult workers put their personal expectations in writing, they will become more goal-directed and better persevere when struggling to acquire or apply new knowledge.

√ Organizational goals must reinforce the goals of participating employees. This will keep everyone's expectations realistic and help avoid the "quick fix" mentality found in too many workforce education programs.

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