DOCUMENT RESUME

ED 379 444 CE 068 221

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TITLE	Workplace Basic Skills Assessment Tools. Library Research Report.
PUB DATE	94
NOTE	114p.; Master's Paper, Colorado State University.
PUB TYPE	Information Analyses (070) -- Dissertations/Theses - Undetermined (040)
EDRS PRICE	MF01/PC05 Plus Postage.
DESCRIPTORS	*Achievement Tests; Adult Basic Education; *Basic Skills; *Employer Attitudes; Employment Qualifications; Literature Reviews; *Personnel Evaluation; State of the Art Reviews; Tables (Data); *Test Validity
IDENTIFIERS	*Workplace Literacy

ABSTRACT

A study examined the relationships between the skills measured by basic skills assessment tools and the competencies that U.S. employers desire of their hourly employees. The basic skills desired by employers were identified through a literature review. Tools for assessing adult basic/employability skills that are currently available from a total of 24 publishers were analyzed from the standpoint of the extent to which their content (skills measured), validity, and reliability conform to employers' stated needs for assessment tools. It was concluded that suitable assessment tools currently exist for assessing the following skills/competencies identified in the Secretary's Commission on Achieving Necessary Skills (SCANS) and desired by U.S. employers: reading, writing, computation, oral communication, listening, problem solving, self-management, knowing how to learn, teamwork, and leadership. The greatest numbers of instruments are available for assessing reading, writing, and computation skills. Twenty specific assessment tools were recommended for standardized testing of adult basic skills. (Thirteen tables and an 81-item bibliography are included. Appended are the letter sent to publishers, the names/addresses of the 23 publishers contacted, and a bibliography of 21 additional sources regarding basic skills assessment.) (MN)

LIBRARY RESEARCH REPORT

Workplace Basic Skills Assessment Tools

Submitted by

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School of Education

In partial fulfillment of the requirements

for the Degree of Master of Education in Vocational Education

with a Specialization in Adult Education

Colorado State University

Fort Collins, Colorado

Fall 1994

This paper is dedicated to my husband, David,

my sons, Philip and A.J.,

my parents, Al and Helen Southwood,

and my friends,

without whom I couldn't have done it.

Abstract

This report answers the question "What is the relationship between those skills measured by basic skills assessment tools and the competencies desired by employers for their existing hourly employees in the United States?" It was found that most of the Secretary's Commission on Acquiring Necessary Skills competencies and the skills listed in the American Society for Training and Development study by Carnevale (1988) can now be assessed by tools. Many of these have been developed only recently using a workplace functional context. This report investigated assessment tools for measuring reading, writing, computation, oral communication, listening, problem solving, self-management, knowing how to learn, teamwork, and leadership. Tables include a list of publishers contacted, a list of assessments for each publisher and the skills tested by each, a table rating the validity and reliability of the assessments, and a table of factors affecting the recommendations for those which most closely measure skills employers desire for their hourly employees. Appendix B is a list of publishers, addresses, phone numbers, contact person, and assessments available.

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Chapter I

Introduction

Employers throughout the United States have similarities in the basic skills they require for their semi-skilled and unskilled employees. As global competition and technological advances increase, the presence of these skills will become increasingly important for improvement of quality, efficiency, re-training, customer service, and cost reductions (Secretary's Commission on Achieving Necessary Skills, 1991).

Need/Rationale for the Study

The United States has very few adults who are illiterate (can neither read not write), but many who are functionally illiterate. In 1986 there were 51.8 million Americans over the age of 16 who had not graduated from high school. Twenty-six million of those had not completed the eighth grade level (Martin & Fisher, 1989). In addition one million high school youths drop out each year without a high school diploma (Martin & Fisher, 1989).

Further evidence of low literacy levels in large portions of the United States adult population were reported by the National Center for Education Statistics, U.S. Department of Education (Kirsch, Jungeblut, Jenkins, & Kolstad, 1993; Kirsch, Jungeblut & Campbell, 1992; Kirsch & Others, 1993). The National Adult Literacy Survey gathered information on 26,000 people age 16 or older in the first eight months of 1992. Demographic information as well as knowledge and skills on three scales were surveyed. The scales were prose literacy, document literacy and quantitative literacy with results grouped into five categories for each scale. Because of the random selection of the survey participants, the results were used

for conclusions about the 191 million adult population of the United States. "Twenty-one to 23 percent--or some 40 to 44 million of the 191 million adults in this country--demonstrated skills in the lowest level of prose, document, and quantitative proficiencies (Level 1)" (Kirsch, Jungeblut, Jenkins, & Kolstad, 1993, p. xiv). Most in this level were immigrants, non-high school graduates, senior citizens, or those with limiting mental, physical, or health conditions. Individuals in Level 2 made up 25 to 28 percent of those surveyed. This indicates that approximately 90 million adults in the United States have knowledge and skills in the lower two levels of the scales. Over two-thirds of these 90 million adults perceived themselves as reading at least "well" and being able to perform their every day tasks without assistance.

Employers have perceived the lack of not only prose, document, and quantitative knowledge and skills, but other skills as well which they desired their employees to have as global competition and technological advances increased. A study released in 1993 by the U.S. Small Business Administration which surveyed 1,288 businesses about their training, showed that skills such as reading, oral communication, and general problem-solving were found to be important to companies of all sizes ("SBA Study," 1994). Fields, Hull, and Sechler (1987) found that the skills of speaking, listening, and basic mathematics were integrated with reading and writing, thus warranting inclusion as literacy skills. In his seminal study for the American Society for Training and Development, Workplace Basics: The Skills Employers Want, Anthony Carnevale found seven skill areas desired by employers (Carnevale, Gainer, & Meltzer, 1988). The Secretary's Commission on Achieving Necessary Skills (1991) also found common skills

which employers desired their personnel to possess. What Work Requires of Schools, A SCANS Report for America 2000 (Secretary's Commission on Achieving Necessary Skills [SCANS], 1991) listed three foundational areas of skills and five competency areas to be built upon those foundational skills.

Businesses and government realized the need to improve the basic skills of workers for better job performance (Office of Public Information, 1988) as technology and global competition increased. A National Workplace Literacy Program was funded by the federal government in 1988 (Office of Vocational and Adult Education, 1992). Selected community colleges, universities, or private consultants who formed partnerships with corporations received grants to establish on-site educational programs using contextual curriculums (Office of Vocational and Adult Education, 1992). The results of these programs were reported to the Office of Vocational and Adult Education to be used as models for other workplace literacy programs funded by private corporations.

Problem Statement

Background to the Problem

Providing education which meets the needs of the adult learners is one of the key elements in motivational instructional design (Wlodkowski, 1985). Assessing the needs of the adult learners and designing the instruction to meet those needs is one of the principles of instructional design (Johnson & Foa, 1989; Seels & Glasgow, 1990). Effective workplace basic skills instructional design involves the assessment of the skills as needed in the workplace and customizing the curriculum to teach those skills using functional context (Rothwell & Brandenburg, 1990).

The needs assessment for workplace basic skills training can utilize several methods. Critical incidents, interviews or surveys, task analysis, and literacy audits are recommended (Rothwell & Brandenburg, 1990). The literacy audit is the most common method and involves individual paper-and-pencil tests or oral examination to assess the gap between the skills employees have and those employers desire employees to have in the workplace. Human resource development personnel are faced with finding the assessment tools available and then deciding which assessment tools are most appropriate for their workplace (Rothwell & Brandenburg, 1990). Standardized tests for kindergarten through the twelfth grade may not test skills needed by adult workers. In the area of reading, for instance, tests used for children may be oriented to reading fiction, whereas employees are asked to read instructions, graphs, and other documents.

Statement of the Problem

Human resource personnel have the problem of selecting assessment tools which measure the basic skills employers want their hourly employees to possess from the many available options. The problem statement for this library research report is as follows: "What is the relationship between those skills measured by basic skills assessment tools and the competencies desired by employers for their existing hourly employees in the United States?"

Research Questions

The answer was developed by looking at the following questions:

1) What are the basic skills employers want in their existing hourly employees?

2) Which assessment tools are available for measuring basic skills of hourly employees in the United States?

3) What are the skills measured by basic skills tests for adults?

4) What is the validity of the assessment tool and how was it determined?

5) What is the reliability of the assessment tool and how was it determined?

6) Which assessment tools are most applicable to the workplace for measuring the competency it was designed to measure?

Definition of Terms

The definition of terms for the skills employers want their employees to possess were taken from the SCANS report (1991), What Work Requires of Schools, A SCANS Report for America 2000. Not all skills listed in this report have assessment tools available. Those listed are the ones for which it was expected that tests may have been developed.

Basic skills training

Needs assessment	"the process of identifying gaps between what people already know or do when they start working and what they should know or do to succeed in job-specific training and subsequently perform their jobs competently" (Rothwell & Brandenburg, 1990).
Reading	"Locates, understands and interprets written information in prose and documents--including manuals, graphs, and schedules--to perform tasks; learns from text by determining the main idea or essential message; identifies relevant details, facts, and specifications; infers or locates the meaning of unknown or technical vocabulary; and judges the

	accuracy, appropriateness, style, and plausibility of reports, proposals, or theories of other writers" (p. C-1).
Writing	"Communicates thoughts, ideas, information, and messages in writing; records information completely and accurately; composes and creates documents such as letters, directions, manuals, reports, proposals, graphs, flow charts; uses language, style, organizations, and format appropriate to the subject matter, purpose, and audience. Includes supporting documentation and attends to level of detail; checks, edits, and revises for correct information, appropriate emphasis, form, grammar, spelling, and punctuation" (p. C-1).
Arithmetic	"Performs basic computations; uses basic numerical concepts such as whole numbers and percentages in practical situations; makes reasonable estimates of arithmetic results without a calculator; and uses tables, graphs, diagrams, and charts to obtain or convey quantitative information."
Mathematics	"Approaches practical problems by choosing appropriately from a variety of mathematical techniques; uses quantitative data to construct logical explanations for real world situations; expresses

	mathematical ideas and concepts orally and in writing; and understands the role of chance in the occurrence and prediction of events" (p. C-1).
Oral communication or speaking	"Organizes ideas and communicates oral messages appropriate to listeners and situations; participates in conversation, discussion, and group presentations; selects an appropriate medium for conveying a message; uses verbal language and other cues such as body language appropriate in style, tone, and level of complexity to the audience and the occasion; speaks clearly and communicates a message; understands and responds to listener feedback; and asks questions when needed" (p. C-1).
Listening	"Receives, attends to, interprets, and responds to verbal messages and other cues such as body language in ways that are appropriate to the purpose; for example, to comprehend; to learn; to critically evaluate; to appreciate; or to support the speaker" (p. C-1).
Problem solving	"Recognizes that a problem exists (i.e., there is a discrepancy between what is and what should or could be), identifies possible reasons for the discrepancy, and devises and implements a plan of

	action to resolve it. Evaluates and monitors progress, and revises plan as indicated by findings" (p. C-1).
Self-management	"Assesses own knowledge, skills, and abilities accurately; sets well-defined and realistic personal goals; monitors progress toward goal attainment and motivates self through goal achievement; exhibits self-control and responds to feedback unemotionally and non-defensively; is a 'self-starter'" (p. C-2).
Knowing how to learn	"Recognizes and can use learning techniques to apply and adapt new knowledge and skills in both familiar and changing situations. Involves being aware of learning tools such as personal learning styles (visual, aural, etc.), formal learning strategies (notetaking or clustering items that share some characteristics), and informal learning strategies (awareness of unidentified false assumptions that may lead to faulty conclusions)" (p. C-2).
Teamwork or Participates as a Member of a Team	"Works cooperatively with others and contributes to group with ideas, suggestions and effort" (p. B-1).

Leadership or Exercises Leadership	"Communicates thoughts, feelings, and ideas to justify a position, encourages, persuades, convinces, or otherwise motivates an individual or groups, including responsibly challenging existing procedures, policies, or authority" (p. B-1).

Library Research Strategy

The seventeen publishers listed in Rothwell and Brandenburg (1990) were mailed letters and three other publishers discovered through networking were also mailed letters. Government publications were obtained through use of the electronic card catalog system (Colorado Alliance of Research Libraries) at Colorado State University. Books on the topic were also be obtained through the electronic card catalog system at Colorado State University. Titles of articles in Educational Resources Information Center (ERIC) including the combination of Current Index to Journals in Education (CIJE) and Resources in Education (RIE) from 1966 to March 1994 were accessed through the Colorado State University on-line system. The Business Index and ASAP (full text of articles on-line) from 1988 to March 1994 were accessed through the Colorado State University on-line system. The CD-ROM PSYCLIT was checked as a source of literature. The University of Northern Colorado and the Colorado Department of Education Library were accessed through their on-line connection with the Colorado State University electronic catalog.

Chapter II

Review of the Literature

This review of the literature answered the question, "What is the relationship between those skills measured by basic skills assessment tools and the competencies desired by employers for their existing hourly employees in the United States?" The first question answered was, "What are the basic skills employers want in their existing hourly employees?"

Basic Skills Desired by Employers

Kirsch, Jungeblut, & Campbell (1992) found that approximately 90 million adults in the United States have knowledge and skills in the lower two of the five levels of the measurement scales used in a study by the Educational Testing Service. These adults were very unlikely to be able to do quantitative tasks involving setting up a problem and performing two or more sequential operations. They also had difficulty synthesizing or integrating information from lengthy prose. Some of the test items were based on workplace graphs and charts, reading requirements, and computational situations. It is interesting to note that the reading and using charts section of the test was considered to be at a simple level.

Numerous articles referred to the skills employers desire in their hourly employees. Bell (1991), Goddard (1989), "Toward a World-Class" (1991), and "More Signs" (1991) all emphasized the importance of reading, writing, and computation. Goddard (1989) also highlighted problem solving skills. "Toward a World-Class" (1991) reported a survey of 1,120 Illinois business people, recommending the following skills: communication, employability, critical thinking, group and teamwork, personal and career development, keyboarding and

computer literacy, leadership, and basic concepts of technology systems. "More Signs" (1991) added dissatisfaction with technical skills, thinking, reasoning, and problem-solving skills of employees in Washington state.

Since 1987 the need for workers with organizational, computer, and communication skills has increased ("Skills Screening," 1992). There is also a lack of enough workers with technical ability, math skills and customer service skills. The American Management Association survey in 1990 and 1992 of over 1000 human resources managers found a lack in the job applicants of reading and math skills desired by employers (Greenberg, 1990; "Increased Skills," 1993). In a survey by Olsten Corporation 443 organizations reported an increase in their need for employees with communication skills, basic computer skills, and organizational skills (Laabs, 1993). Stamps (1994) found that ideas which are becoming more prevalent in the commercial industry and which could be incorporated in training for the defense industry are team-based manufacturing, new approaches to quality control, and improved customer service.

Anthony Carnevale found seven skill areas desired by employers in his seminal study, Workplace Basics: The Skills Employers Want (Carnevale, Gainer, & Meltzer, 1988). Other publications have indicated the significance of its findings (Northwest Workplace Basic Skills, 1993b; Welter, 1989). Carnevale listed the foundational level as knowing how to learn. The next six levels were as follows: competence: reading, writing, and computation; communication: listening and oral communication; adaptability: creative thinking and problem solving; self-esteem, goal setting, motivation, personal/career development; group effectiveness:

interpersonal skills, negotiation, and teamwork; influence: organizational effectiveness and leadership.

The Labor Department also found common skills which employers desired their personnel to possess (Secretary's Commission on Achieving Necessary Skills [SCANS], 1991). Other publications have indicated the significance of the findings (Harvey, 1992; Northwest Workplace Basics, 1993b; "School to work," 1993; "Toward a New Definition," 1992; Weber, 1992). The skills can be at a complex level for management personnel and at a basic level for hourly employees. What Work Requires of Schools, A SCANS Report for America 2000, (SCANS, 1991) listed three foundational areas of skills. The Basic Skills area included "reading, writing, arithmetic and mathematics, speaking, and listening" (SCANS, 1991, p. vii). The Thinking Skills area included "thinking creatively, making decisions, solving problems, seeing things in the mind's eye, knowing how to learn, and reasoning" (SCANS, 1991, p. vii). The Personal Qualities area included "individual responsibility, self-esteem, sociability, self-management, and integrity" (SCANS, 1991, p. vii). The five competency areas were Resources, Interpersonal Skills, Information, Systems, and Technology. The Interpersonal Skills included, among others, working on teams and leadership.

Assessment Tools Available

The next questions answered were as follows:

2) Which assessment tools are available for measuring basic skills of hourly employees in the United States?

3) What are the skills measured by basic skills tests for adults?

4) What is the validity of the assessment tool and how was it determined?

5) What is the reliability of the assessment tool and how was it determined?

The assessment tools were reviewed according to the basic skills measured by them. Questions 3, 4, and 5 were answered during the review of each test.

Publishers' Response

Letters of request were sent to 24 publishers listed in various references as sources for tests for adult basic skills. The list of publishers is in Exhibit 1, Chapter III, Research Question 2. A sample of the letter sent is in Appendix A. A list of current addresses, phone numbers and tests distributed by each publisher is in Appendix B. Competencies considered in this paper and tests for assessing each competency are listed in Table 1, Chapter III, Research Question 3. The reader may find that list helpful in following the discussion below. Appendix C is a list of additional sources on this topic other than those in the reference list.

Reading

American College Testing Company

Work Keys is a new system recently developed by the American College Testing Company for teaching and assessing employability skills. It is comprised of "four major components--assessments, job profiling, curriculum and instruction, and recording and reporting services" (American College Testing Program (ACT), 1993, p. 1). Assessments to measure individual workplace competencies and to determine business training needs became available in 1993 and the complete system will be available in 1995. The development of the system has been a long-range project involving representation from seven charter states, community colleges, state directors of vocational and technical education, secondary school principals, and a variety of large, medium, and small businesses throughout the

United States (ACT, 1993; McLarty, 1992). The workplace skills to be assessed were determined by reviewing the SCANS reports, Carnevale's study, and others to compile an initial list. The representatives listed above were consulted for priorities (McLarty, 1992). By the end of 1994 Work Keys will have ten criterion-referenced assessments available, one of which is Reading for Information (ACT, 1993). Criterion-referenced tests are also known as competency-based tests.

Skills measured. The Work Keys staff developed skill descriptions for the first assessment tools including Reading for Information. There were skill descriptions for each of the five levels of skill. Business representatives and entry-level employees were asked whether the skills were in entry-level jobs and were appropriate for each of the five levels (McLarty, 1992). A study of written job analyses showed that they were not detailed enough to be helpful. All questions are based on functional context supplied by the business representatives. "The Reading for Information test measures the examinees' abilities to read and understand work-related instructions and policies. . .Selections are in the form of memos, bulletins, notices, letters, policy manuals, and governmental regulations" (McLarty, 1992, p. 25). A reading selection is given and one to four multiple-choice questions follow at the same level of difficulty as the reading selection . Difficulty of vocabulary, applying information, and making inferences increases with each level (ACT, 1993; McLarty, 1992).

Validity. Content validity was increased by having representatives of vocational schools, community colleges, and large, medium, and small businesses involved in the design process (ACT, 1993; McLarty, 1992). It was also increased by being constructed as a criterion-referenced test and utilizing sample materials

from a wide variety of workplaces. The possible list of assessments based on the SCANS and other reports were ranked for importance by business and educators and then the creation of the assessments was scheduled taking the rankings into account (McLarty, 1992). The rankings validated the need for these skills in the workplace. The Reading for Information and Listening and Writing tests were validated for the customer service agent job at Federal Express (Hater, 1992). "Eight subject matter experts (SMEs) took the Work Keys tests. . .All SMEs thought the tests were fair and valid measures of the skills used in the job" (Hater, 1992, p. 1). Validation will continue because the tests have only recently been developed (Vansickle, 1992).

Reliability. A pre-test of the Reading for Information assessment was given to 5741 students, 97% of whom were high school students. The most difficult contiguous level mastered was compared with the most difficult level mastered regardless of contiguity. "This type of contiguity information is one form of describing the reliability of the Work Keys assessments and is based on the score scale, not the items" (Vansickle, 1992). The consistency was more than 95%. A scale was developed to classify test-takers into one of five categories. "The scale classifies individuals into skill levels with a great deal of consistency" (Vansickle, 1992).

Comprehensive Adult Student Assessment System (CASAS)

"The Comprehensive Adult Student Assessment System (CASAS) is the most widely used system for assessing adult basic skills within a functional context" (CASAS, 1993c, p. 1). The CASAS reading assessment measures the learner's basic reading skills using common every day situations (Sticht, 1990; Stromquist,

1991; Zellers, 1986). The CASAS appraisal is given to determine which of four levels of standardized tests is appropriate for the individual (CASAS, 1993a). Tests can be administered only by those who have been trained (CASAS, 1993c; Stromquist, 1991). There is a reading assessment for life skills and for employability (CASAS, 1990; CASAS, 1991a; Stromquist, 1991). Workforce Learning Systems is one part of CASAS which includes assessment of job-related skills such as reading and many other of the SCANS competencies (CASAS, 1994a; CASAS, 1994b; CASAS, 1992). Tests are compiled from a test bank of 6000 items (CASAS, 1993b) categorized by the skill measured (CASAS, 1994b).

Skills measured. The reading for employability assessment includes identifying and using "sources of information about job opportunities such as job descriptions and job ads" (CASAS, 1990, p.1), interpreting "work safety manuals and related publications" (CASAS, 1990, p.1), interpreting "procedures for simple first aid" and "safety signs" (CASAS, 1990, p.1), using "library resources, reference materials, content tables, indexes, and dictionaries" (CASAS, 1990, p.1), interpreting "employee handbooks" (CASAS, 1990, p.1), and recognizing and using "occupational signs, charts, forms and written directions" (CASAS, 1990, p.1). Customized tests can be assembled by choosing particular competencies from the Life Skills Competencies list (CASAS, 1994b).

Validity. Validity refers "to whether or not a test measures what it purports to measure and only that" (Sticht, 1990, p. 24). "Validity refers to the extent to which an instrument measures what it is intended to measure" (Ary, Jacobs, & Razavieh, 1990, p. 256). The Standards for educational and psychological testing of 1985 stated that ideally a validation for an assessment tool will include construct-related,

content-related, and criterion-related evidence of validity. CASAS provided all three and was validated through the Rasch model as well (CASAS, 1993d). "CASAS has been evaluated by the U.S. Department of Education and is approved as an effective, nationally validated program" (CASAS, 1993c, p. 2). "All assessment has been validated through field-testing with adult learners. . ." (CASAS, 1993c, p. 1).

The CASAS tests were found to have adequate unidimensionality by an independent study. Subsets of items considered to be identical were traded into complementary forms of tests. The item difficulties were found to be stable. This consistency of test items allowed for the use of the Rasch model in construct validity (CASAS, 1993d). The statistics guided the decisions of test analysts. Content validity was determined by "adult educators representing approximately 30 percent of all federally funded adult education agencies in California" (CASAS, 1993d, p.38). These experts defined a taxonomy of adult life skills upon which the different levels of tests are based. In regard to criterion validity, CASAS levels correlated to the SPL proficiency levels developed by a national group of experts in teaching English to refugee adults. In the higher level tests the CASAS reading scores were correlated to student success in passing the GED (CASAS, 1993d).

Reliability. "The reliability of a measuring instrument is the degree of consistency with which it measures whatever it is measuring"(Ary, Jacobs, Razavieh, 1990, p. 268). A test score consists of the true score and some error of measurement. Some of the variance in the test scores will be true variance in measuring consistency and some will be due to errors of measurement (Ary, Jacobs, Razavieh, 1990). "The errors of measurement of CASAS tests are

addressed not only by traditional means, applied to each test as a whole, but also applied to examinee ability level, based on item response theory"(CASAS, 1993d, p. 25). Under traditional reliability, the KR-20 coefficients for the six tests in the 70 series were almost all above .80. Item distracters were analyzed by high-low reports and items with results which varied from those expected were rewritten, eliminated, or re-tested in the field. Various statistics were used to compare "the item curve against the actual test curve" (CASAS. 1993d, p. 25). The mean, standard deviation, and KR-20 correlation coefficients are given for six tests in 70 series. The coefficients range from .81 to .89. Under the item response theory (IRT) approach a standard error of measurement for each ability was calculated. This resulted in a standard error for every possible test score along the variable. These were provided in a table. Most of the standard errors are between three and four for a scaled score of about 200. The errors are large at the extremes of the scores (CASAS, 1993d).

Cornell Institute for Occupational Education

The Cornell Test of Basic Skills (CTBS) was developed by the Cornell Institute for Occupational Education (CIOE) at Cornell University. CTBS is a criterion-referenced test (competency-based) of specific skills in reading and basic mathematics (CIOE, 1984b).

Skills measured. The CTBS measures reading comprehension and can pinpoint specific skill deficiencies. It measures six different types of reading comprehension which are placed in two categories, Informational Reading and Critical Reading (CIOE, 1984b). Under the first category is Reading for Facts which tests "the ability to skim, to isolate the information of interest, and to test the adequacy of that

information against one's needs" (CIOE, 1984b, p. 3). Reading for Direction, also in the first category, assesses the ability to read instructions and follow them by comprehending the facts as well as the sequence. Third in this category is Reading for Ideas, which tests the ability to read for concepts and ideas and comprehend the relations between them. Relations such as cause and effect and subordinate and super ordinate must be understood for comprehension in this area. In the Critical Reading category are tests for Reading to Infer Meaning, Reading to Generalize, and Reading to Detect Fallacy or Persuasive Intent. Reading questions are based on six story lines at a grade level from 2.5 to 9.5.

Validity. Comparing the performance of test-takers to people who are known masters of the skills is a way to validate a test (Shrock & Coscarelli, 1989). "...the CTBS can also be scored in a way that permits comparison with the performance of various reference groups, such as 'successful graduates of particular vocational programs'" (CIOE, 1984b, p. 1). Concurrent validity was established with a sample of 2700 New York high school seniors in 1981 (CIOE, 1984b) and other state norms by test section (CIOE, 1987). Content specification was the basis for the validity of the CTBS. For the reading test comprehension, the ability to read and understand what one has read, was the focus. Six different types of reading comprehension are measured by the CTBS (CIOE, 1984b).

Reliability. The split-half reliabilities of the tests range from .96 to .99, which are comparable to major standardized tests (CIOE, 1984b).

CTB/McGraw-Hill, Inc.

The Tests of Adult Basic Education (TABE) have been published since 1957 (Kramer & Conoley, 1992). TABE, Forms 5 and 6, copyright 1987, are

completely rewritten parallel forms of earlier versions and are widely used. They are norm-referenced tests, which can provide criterion-referenced scores as well, for achievement in reading, mathematics, language and spelling (CTB/McGraw-Hill, 1994a; Kramer & Conoley, 1992; Taylor, 1990). The content is appropriate for adults and focuses on skills needed to function in society (CTB/McGraw-Hill. 1994a; Taylor, 1990). The Locator Test is given to test-takers first. It indicates which of the four levels of the test is appropriate for the individual. The four levels range in difficulty from grade 2.6 to 12.9--easy to advanced (CTB/McGraw-Hill, 1994a; Kramer & Conoley, 1992; Taylor, 1990). "The content categories were defined by examining adult education curriculum guides, published texts, and instructional programs" (Taylor, 1990, p. 4). TABE, Forms 5 and 6, were designed with an academic orientation for adults. They are stronger for use in the workplace than assessments designed for children (Taylor, 1990).

The TABE, Forms 7 and 8, are being introduced in 1994 with all new items. "Form 7 will be available in August, 1994, with Form 8 to follow in spring, 1995" (CTB/McGraw-Hill, 1994b). They assess a wide-range of concepts and basic skills needed to work and live based on integrated objectives. Correlations with the scores predict success on the GED test. The new parallel test forms are a response to suggestions by loyal TABE users. The locator test, given first, directs which of five levels of tests is to be administered. The levels range from grades 0 to 14.9 (CTB/McGraw-Hill, 1994b).

TABE-WF (Work-Related Foundation Skills) is a new assessment which gives information for planning occupational education programs in four different areas--Health, Trade/Technical, Business/Office, and General. Each one assesses in an

applied manner basic reading, math, and language skills. The skills are assessed in proportion to the needs of the occupational area by providing appropriate context. The General Form covers a variety of work concepts (CTB/McGraw-Hill, 1994b). TABE-WF is calibrated to TABE, Forms 5 and 6, and will be calibrated to TABE, Forms 7 and 8, in August 1994.

Skills measured. TABE, Forms 5 and 6, assesses reading through two tests, Reading Vocabulary and Reading Comprehension. The vocabulary test is based on a given word--identifying the meaning, antonym, or affix meaning. The comprehension test is based on a given passage of fiction or non-fiction prose. The test-taker is asked to locate information, infer traits or feelings of characters, identify the main idea, interpret by drawing conclusions or making predictions, differentiate between forms of writing, and interpret persuasive language (CTB/McGraw-Hill, 1987). TABE, Forms 7 and 8, measures the ability to read prose and to read documents, such as charts, maps, diagrams, and tables, on one test instead of two (CTB/McGraw-Hill, 1994b). Both life skills and academic contexts are included on an adult level. For TABE-WF no further information about the skills measured was given.

Contemporary Books, Inc. has published curriculum books which correlate to the Test of Adult Basic Skills (TABE), Forms 5 and 6, levels E, M, D, and A (Contemporary Books, Inc., 1991). Contemporary Books, Inc. has graphics materials which correspond to the levels of TABE 5 and 6. These can be used to teach reading of graphs, charts, tables, and maps (Contemporary Books, Inc., 1991).

Validity. The published catalogs state that all CTB/McGraw-Hill tests show sufficient evidence of validity and provide information about how the results may be used (CTB/McGraw-Hill, 1994b). However, reviews of TABE, Forms 5 and 6, indicated some weaknesses in the information provided. "The development process is the sole basis for validity of the tests. Content validity is the only type of validity justification" (Kramer & Conoley, 1992, p. 984). Because the test results will probably be used for admissions and classification decisions, evidence of criterion-validity should be provided also. Weak correlation to GED scores (.55 to .64) is the only external validity presented (Kramer & Conoley, 1992; Taylor, 1990). "It appears CTB/McGraw-Hill did not follow the precepts put forth in the *Standard for Educational and Psychological Testing* (AERA, APA, & NCME, 1985). . .as it concerns. . . valid interpretations of the scores" (Kramer & Conoley, 1992, p. 986). "Additional validation work is needed to justify the Locator process as well" (Kramer & Conoley, 1992, p. 984).

Reliability. All CTB/McGraw-Hill tests have evidence to show the dependability of the test for the intended use, internal consistency, and stable scores. The reliability of the TABE, Forms 5 and 6, are shown for internal consistency using KR-20 statistics. Additional reliability evidence for parallel forms would be helpful for users. But "no discussion of the equivalence of Forms 5 and 6 was found in the material submitted for review" (Kramer & Conoley, 1992, p. 984).

Curriculum Associates, Inc.

Curriculum Associates, Inc. publishes the Brigance Diagnostic Inventory of Essential Skills, a criterion-referenced test which readily can be translated into

education plans (Curriculum Associates, Inc., 1994b). It uses context from secondary school, home, community, and places of employment. "The Inventory was originally designed for use in secondary programs serving the student with special needs. It is also used in adult education programs" (Curriculum Associates, Inc., 1994a, p. 25). The test, which comes in only one level, utilizes oral and written responses. Many academic and life skills are assessed by the 26 different sections of the test. New in April 1994 is the Brigance Diagnostic Life Skills Inventory (Curriculum Associates, Inc., 1994b). It uses pictures from life situations, such as a meat and dairy keeper in a grocery store, to provide context for basic skills assessments of special education high school students, English as a Second Language students, or adult basic education students. The test sections are similar to the Inventory of Essential Skills.

Skills measured. Oral reading and comprehension are assessed by grade level. Functional Word Recognition is assessed with direction words, safety signs, informational signs, and reading number words. Word analysis, reference skills, and reading schedules and graphs is included also.

Validity. Information on validity was not included in the literature.

Reliability. Information on reliability was not included in the literature.

Educational and Industrial Testing Service (EdITS)

Educational and Industrial Testing Service (EdITS) developed the Career Ability Placement Survey (CAPS) in 1976 (EdITS, 1976). It is part of a system (COPSystem) for assessing interests, abilities, and values for career evaluation and choices (EdITS, 1993). CAPS is the abilities assessment in this system. There are 14 occupational groups for which abilities are assessed. There are eight ability

areas which are combined according to which of the abilities are needed most in each occupational group. This results in an ability assessment for each occupational group (EdITS, 1992). The scores are estimates of success in the occupational area. Four of the eight areas tested can assess skills employers desire as found in national studies.

Skills measured. The CAPS sections on Word Knowledge "measures how well you can understand the meaning and precise use of words" (EdITS, 1992, p. 1). The test-taker chooses the word which is closest in meaning to the given word. It does not involve words in prose or documents.

Validity. The raw score is correlated to a stanine score on a scale of 1 to 8 (EdITS, 1992). The stanine scores are normed against many test scores and assigned a percentile. The percentile is the percentage of a national sample of other test-takers of approximately the same age that the test-taker scored above (EdITS, 1993).

Reliability. No information on reliability was included in the literature provided.

Educational Technologies

Skills 2000 is a set of software program for surveying, analyzing, clustering, and comparing "skills data from jobs, individuals, and training" (Educational Technologies, 1991, Skills Overview). The system is organized by 14 major skill categories, 88 skill areas, and 1734 transferable skills within those areas in a way which is similar to the SCANS report. A business can use the survey program to have supervisors and job incumbents rate the skills needed for the job by extent and importance. The software determines which basic skills are needed for the more

complex skills . Then the software can assess individuals according to the basic skills needed for the job by using TABE (Test of Adult Basic Education published by CTB McGraw-Hill). The questions which assess the skills needed for that job as entered in the software are given to the test-taker. Appropriate training is provided by the software for improvement of those skills (Educational Technologies, 1991). Skills 2000 also provides reports by clustering of jobs in the data base, for training needs and completion status by individual, and by lists of individuals needing various training.

Skills measured. The skills measured are the same as those on TABE, Form 5 and 6.

Validity. TABE has been validated in a general sense (see TABE validity under reading), but this software increases the validity for the particular job it is being used for. Job experts have input data about those skills used most in that job and the software has selected those items on TABE which correspond to those skills.

Reliability. See TABE reliability under reading.

Educational Testing Service (ETS)

Educational Testing Service (ETS) developed the ETS Tests of Applied Literacy Skills (TALS) in 1990. They are competency-based tests with open-ended questions based on adult contextual materials reproduced in their original form (Kirsch, Jungeblut, Jenkins, and Kolstad, 1993). The materials are taken from a broad range of "universally relevant contexts and contents" (Kirsch, Jungeblut, Jenkins, and Kolstad, 1993, p. 70). The National Adult Literacy Survey (NALS) commissioned by the U.S. Department of Education was based on TALS. There are three tests of each of the parallel forms--prose, document, and quantitative

literacy. The scores for each test are scaled from 0 to 500 and placed into one of five categories. The items are rated for difficulty on the same scale (ETS, 1991; Kirsch, Jungeblut, Jenkins, and Kolstad, 1993).

Skills measured. Reading skills are measured in all three sections of TALS, but are measured most extensively in the prose and document literacy tests. The prose selections are mostly expository articles, but some narratives and poetry are included as well. The questions are printed before the article. Test-takers using the skills of skimming and scanning could usually answer all the questions. The test-taker is directed to underline the answer in the text or to write it in after the question. Inferences are required for the higher level questions (ETS, 1990a; ETS, 1990b; ETS, 1991). The document literacy materials are usually tables, charts, graphs, forms, and maps. The test-taker is required to locate, integrate, and generate information on both the prose and document literacy tests.

Validity. Validity was not addressed directly in the materials supplied. Evidence of validity is the replication in original form of materials from a variety of adult contexts upon which the questions are based. Open-ended questions are another evidence of life skills validity, because multiple choices are rarely given in work or community situations. Over 26,000 adults were surveyed in 1992 using items similar to those on TALS (Kirsch, Jungeblut, Jenkins, and Kolstad, 1993).

Reliability. Reliability based on coefficient Alpha were .91 and .92 for Forms A and B for Prose. For Forms A and B for Document the coefficients were . 92 and .89. These are "quite acceptable given the test form lengths" (ETS, 1991, p. 2-5).

Oregon State Board of Education, Office of Community College Services

Oregon State Board of Education, Office of Community College Services cooperated in an interagency project from 1991 through 1994 involving education, economic, and business groups from Oregon and Washington (NWB, 1993b). The project was funded by the state legislatures and federal agencies for the purpose of designing assessments for the workplace and developing a list of curriculums pertinent to the skills assessed. The skills the project wanted to assess were based on the study for the American Society for Training and Development, Workplace Basics: The Skills Employers Want (Carnevale, Gainer, Meltzer, 1988). Individual competencies were listed under seven large headings. These were confirmed by 268 employers and 147 educators, job trainers or government employees. During the confirmation of the competencies in that study, the SCANS competencies were also correlated to this list of Northwest Workplace Basics (NWB) competencies. The Basic Skills of reading, writing, and computation were already being assessed by BASIS, an assessment developed by CASAS for use in Oregon and Washington (NWB, 1993b). Communication (see Oral Communication and Listening below), Thinking Skills (see Problem Solving below), and Personal Management for the Job also were developed by CASAS in cooperation with this project. Northwest Regional Educational Laboratory was contracted to design tests for this project under three headings--Learning to Learn, Group Effectiveness, and Influence. These will be reviewed under the appropriate headings below. "The assessment tasks are generally focused on the work environment" (NWB, 1993b, p. 15) and utilized input of representatives from cooperating groups. The field testing and final project reports were completed in June 1994.

Validity. Validity information was not provided for these very new assessments.

Reliability. Reliability information was not provided for these very new assessments.

Progressive Evaluation Systems Company (PESCO International)

PESCO International has designed a software system, Compute-a-Match, for matching individuals with training and jobs. The system includes the Vocational Aptitude Battery (VAB) which is a series of eleven norm-referenced aptitude tests (PESCO International, 1988). They are based on the Department of Labor's Dictionary of Occupational Titles (DOT). The aptitude results are then correlated with DOT job titles and descriptions. Possible employers for those job titles can be matched by zip code. SAGE and JOBS III are incorporated in the software. The software also includes the TABE, Forms 7 and 8, assessment for basic skills. This can be given in part or in full. The Compute-a-Match system provides a comprehensive match between individuals by aptitude, interests, work attitudes, temperament, and basic skills with training needed and possible jobs which could be a suitable match (PESCO International, 1990).

Skills measured. Five of the eleven VAB aptitude tests are paper-and-pencil multiple-choice tests. Two of these tests are for verbal and numerical aptitudes. The other six of the eleven "tests are performance tests with manipulative responses required" (PESCO International, 1988, p. 7).

Validity. The VAB has high face validity for work because the test items are all work-related. Workers perform better on a test which is supposed to be work-related, when it appears to be work-related (Loch, 1992,). The definitions are from

the DOT and correspond to a government designed aptitude test. The tasks used to clarify and scale the DOT's definitions were not verified through a formal validity study (Loch, 1992). Predictive validity evidence was provided by comparing VAB test results with final training course grades for 51 new sheet metal assemblers and riveteers. The correlation coefficients were adequate to predict course grades of prospective employees (Loch, 1992).

Reliability. Face validity contributed to a higher reliability of VAB. Because test-takers will see the test as relating to work they would do on the job, their increased motivation will contribute to more consistent results (Loch, 1992).

The Psychological Corporation

The Psychological Corporation publishes or distributes four different test batteries for basic skills assessment--Clerical Basic Skills Test (BST), Adult Basic Learning Examination (ABLE), Industrial Reading Test (IRT), and Wide-Range Achievement Test-3 (WRAT-3) (The Psychological Corporation, 1994). The clerical BST for essential office-related functions was "based on a nation-wide task analysis involving more than 11,000 clerical incumbents from 24 organizations" (The Psychological Corporation, 1994, p. 17). ABLE, designed in 1987, assesses reading, writing, and arithmetic in adult life contexts from occupations, consumer economics, health, government and law, community resources, and the literacy of communication (The Psychological Corporation, 1994; The Psychoiogical Corporation, 1987).

Skills measured. The clerical BST measures verbal comprehension, as well as reasoning, perceptual speed, numerical ability, and typing. ABLE assesses at three different levels depending on the school grade completed. The Vocabulary and

Reading Comprehension tests are multiple choice. Vocabulary assesses knowledge and understanding of words frequently encountered by adults in work or other activities. At the lowest level the words are read aloud to the test-taker. Reading Comprehension tests "both literal and inferential comprehension skills" (The Psychological Corporation, 1987, p. 6) using simple to sophisticated materials, such as signs or insect repellent directions. Industrial Reading Test (IRT), the third test distributed by The Psychological Corporation, measures "reading comprehension of written technical material" (The Psychological Corporation, 1994, p. 30). It does not test knowledge of the subject matter, but rather reading comprehension on passages such as safety devices used by technical workers, importance of blueprints in manufacturing, and basic first aid principles. Wide Range Achievement Test-3 (WRAT-3) can be used for children and adults. It tests basic knowledge of reading (The Psychological Corporation, 1994).

Validity. Validity information is provided with a purchased test. Criterion-related validity for the IRT is based on vocational education students and technical trainees.

Reliability. Reliability information is provided with a purchased test. Reliability for the IRT is based on comparisons of vocational education students and technical trainees.

Riverside Publishing

Test of Achievement and Proficiency (TAP) comes in four levels, corresponding to the four high school grades (Riverside Publishing, 1994; Kramer & Conoley, 1992). Forms K and L were completed in 1993 and are available as a survey battery or complete battery. It was based on "a systematic analysis of state

and local courses of study and instructional materials and methods" (Riverside Publishing, 1994, p. 15). The complete battery represents the variety of high school course offerings including Social Studies and Science.

In addition to TAP, the Life Skills Applications, Forms 1 and 2, are available. Published in 1980, it will be discussed separately below.

Skills measured. The Vocabulary, Reading Comprehension, and Information Processing subtests measure reading skills. Vocabulary words are given in very brief context on the Vocabulary subtest. Fiction and non-fiction passages typical of high school curricular are used to test ability to synthesize and interpret information. Information Processing measures the ability to read maps, charts, graphs, and flow charts; ability to use references to locate information is also measured (Riverside Publishing, 1994).

Validity. A research handbook on the validity, reliability, and test characteristics of TAP is available for purchase. Based on the design of TAP it would appear to be valid for knowledge learned in high school curricular areas.

Reliability. A research handbook on the validity, reliability, and test characteristics of TAP is available for purchase.

Skills measured. The Life Skills Applications Reading Test measures reading labels and signs; understanding phone books and catalogs; interpreting want ads and lease agreements; and understanding tax forms and installment payment forms (Riverside Publishing, 1994).

Validity. Validity was not discussed directly. The test was designed to measure "skills that students and adults must use daily" (Riverside Publishing, 1994, p. 95).

Reliability. The reliability coefficients for the reading tests were .85 or higher (Riverside Publishing, 1981).

Other Assessments

Taylor (1990) reviewed three tests used in Canada, including Canadian Adult Achievement Test (CAAT), TABE Forms 5 and 6, and the Gates-MacGinitie Reading Tests Canadian Edition. CAAT assessed vocabulary and reading comprehension. Some of the items correspond to the workplace and it was high in usability for the workplace compared to other assessments. The Gates-MacGinitie Reading Tests Canadian Edition assesses vocabulary and comprehension. The results provide grade equivalencies, but do "not measure the majority of the specific workplace competencies reported by employers" (Taylor, 1990, p. 7). The Gates-MacGinitie Reading Tests are available from Riverside Publishing in the United States (Riverside Publishing, 1994).

Many published curriculums include an assessment at the beginning of a book or series of lessons. Some published software includes an on-line assessment for targeted learning (Curriculum Associates, 1994b; Jostens Learning, 1992; NWB, 1993a).

Standardized tests are objected to by some adult educators (Stromquist, 1991). Alternative assessments such as interviews, interactive readings, portfolios, observations, simulations, and performance demonstrations are preferred by some to show learning achievement for reading as well as other basic skills. A workplace literacy program for employees in the Indiana Women's Prison interviewed supervisors about the problems they saw in written reports and how much time they spent correcting and teaching their employees to write (Mikulecky, Henard &

Lloyd, 1992). Samples of written reports were requested in order to see the types of problems occurring in context. Such interviews, supported by evidence, can be another way of assessing the basic needs in a workplace.

Writing

American College Testing Program

Skills measured. The Work Keys System developed by the American College Testing Program (ACT) includes a writing assessment based on listening to audio taped work-related messages and writing them down. Notes may be taken before composing the message. Occupational knowledge of the message content is not required and the messages are similar to those received on the phone or from customers, co-workers, or suppliers (ACT, 1994; McLarty, 1992). The message is scored for content for the Work Keys listening score. It is then scored for "writing mechanics (such as sentence structure and grammar) and writing style" (ACT, 1994, p. 3:1) for the writing score.

Validity. See ACT Work Keys validity under Reading.

Reliability. The Listening and Writing assessment was given to 3,319 examinees, 94.5% of whom were high school students. The SPSS-X Reliability procedure was used with "internal consistency and a strict parallel unbiased reliability" (Vansickle, 1992, p. 16) being computed. The coefficients ranged from .89 to .92.

Comprehensive Adult Student Assessment System (CASAS)

Skills measured. The CASAS Workforce Learning Systems assesses communication including listening, speaking, and writing (CASAS, 1992). The

Life Skills and Employability systems also include a performance-based writing assessment (CASAS, 1993a).

Validity. See CASAS validity under Reading.

Reliability. See CASAS reliability under Reading.

CTB/McGraw-Hill, Inc.

Skills measured. TABE, Forms 5 and 6, assesses skills commonly used in writing through three objective tests--Language Mechanics, Language Expression, and Spelling. These assess the skills of using capitalization, punctuation, plurals, pronouns, complete sentences, and paragraphs. Knowledge of correct forms of verbs, adjectives, and adverbs is tested as well. The spelling test provides a sentence with a blank and four choices of how to spell the missing word. TABE, Forms 7 and 8, being introduced in 1994, include both a Language and Spelling Test. The Language Test "integrates the assessment of skills in the areas of usage, mechanics, sentence formation, and paragraph development with such tasks as writing a business letter, a resume, a job-related report, or an essay for the GED" (CTB/McGraw-Hill, 1994a, p. 76) by using objective test items. Spelling receives extra emphasis through a separate test. TABE-WF measures language in the context of one of the four general occupational areas for which tests have been developed.

Curriculum Associates, Inc.

Skills measured. The Brigance Inventory of Essential Skills includes a section on writing, spelling, and forms. The writing section includes assessment of the skills of printing and writing letters of the alphabet, sentence writing, capitalization,

punctuation, writing addresses, and letter writing (Curriculum Associates, Inc., 1994a).

Educational and Industrial Testing Service (EdITS)

Skills measured. Career Ability Placement Survey (CAPS) includes a section on Language Usage (EdITS, 1992). Language Usage asks the test-taker to find which part of a given sentence, if any, has incorrect grammar, punctuation, or capitalization (EdITS, 1976).

Validity. See validity under Reading.

Reliability. See reliability under Reading.

Educational Technologies

Skills measured. The skills measured in Skills 2000 are the same as those on TABE, Form 5 and 6.

Validity. TABE has been validated in a general sense, but this software increases the validity for the particular job for which it is being used. Job experts in the workplace have input data about those skills used most in that job and the software has then selected those items on TABE which match the skills.

Reliability. See TABE reliability under Reading.

Educational Testing Service (ETS)

Skills measured. ETS Tests of Applied Literacy Skills (TALS) are not designed to specifically assess writing but, because the items are open-ended, the ability to write can be observed. Some answers require a few words or completing blanks on a form. Sometimes an explanation or description is required consisting of a sentence or a paragraph (ETS, 1990a; ETS, 1990b; ETS, 1990c; ETS, 1991). The writing is based on context from a variety of adult situations.

Validity. This test has not been validated for writing because it was not designed as a writing test.

Reliability. This test has not been shown to be reliable because it was not designed as a writing test.

The Psychological Corporation

Skills measured. ABLE tests Spelling at all three levels; the upper two levels assess Language also. Spelling words are dictated and written in the blanks at Level 1; Level 2 and 3 are multiple choice. Language measures punctuation, capitalization, and grammar in a multiple choice format (The Psychological Corporation, 1987). WRAT-3 assesses basic knowledge of spelling through words dictated by the test administrator (The Psychological Corporation, 1994).

Validity. Validity information is provided with a purchased test.

Reliability. Reliability information is provided with a purchased test.

Riverside Publishing

Skills measured. TAP assesses writing through the Written Expression section. Questions are about spelling, sentence and paragraph structure, evaluation of written ideas, and grammatical problems (Riverside Publishing, 1994). The Iowa Writing Assessment, also available from Riverside Publishing, assesses the students' "ability to develop, organize, and express their ideas in four writing modes: narration, exposition, analysis, and persuasion" (Riverside Publishing, 1994, p. 16). This assessment is available at two levels. Another assessment available from Riverside Publishing is the Dailey Vocational Tests, copyright 1965 (Riverside Publishing, 1994; Dailey, 1965). It includes the Business English Test

which "measures knowledge of spelling, punctuation, capitalization, and correct usage or grammar" (Dailey, 1965, p. 5).

Validity. See TAP validity under reading.

Reliability. See TAP reliability under reading.

Other Assessments

A workplace literacy program for employees at the Indiana Women's Prison assessed ability to write reports of disciplinary incidents by interviewing supervisors and looking at samples of written reports to discover the problems employees were having. The final evaluation of the program included looking at written reports of those who had participated in the class to see what differences had occurred. It also included interviewing supervisors and employees to see what changes they had noticed after the training had taken place (Mikulecky, Henard, & Lloyd, 1992).

Computation

American College Testing Program

Skills measured. The Work Keys Applied Mathematics "assessment measures the examiner's skill in applying mathematical reasoning to work-related problems" (ACT, 1994, p. 4:1). The problems are written and presented as those in the workplace would be. The examinee must determine from the information given how to solve the problem and calculate the correct answer. Calculators and a formula sheet may be used as they would be in the workplace. There are five levels of problem complexity. Addition, subtraction, multiplication, and division of whole number, fraction, decimals, or percentages are included. Reading charts or graphs, converting measurements, using negative numbers, doing multiple

calculations, using volume formulas, and nonlinear functions are included in the upper levels.

Validity. See ACT Work Keys validity under Reading.

Reliability. A pre-test of the Applied Mathematics assessment was given to 6236 examinees, 97.5% of whom were high school students. The most difficult contiguous level mastered was compared with the most difficult level mastered regardless of contiguity. "This type of contiguity information is one form of describing the reliability of the Work Keys assessments and is based on the score scale, not the items" (Vansickle, 1992, p. 12). The consistency was more than 96.8%. A scale was developed to classify test-takers into one of five categories. "The scale classifies individuals into skill levels with a great deal of consistency" (Vansickle, 1992, p. 13).

Comprehensive Adult Student Assessment System

The Workforce Learning System assesses job-related basic skills such as math (CASAS, 1992). The Employability Competency System (ECS) includes a math section at all levels (1991b). In the Employability series of the CASAS tests, items for a range of employment related competencies were drawn from the field-tested, 6000-item bank (CASAS, 1993b).

Skills measured. The Employability series math test assesses ability to locate information on a chart or sign and perform a calculation. Computation items and word problems are also presented in multiple-choice format. Computing with fractions, using coins and currency, and interpreting maps, graphs, temperatures, wage information, measurements, and labels are included (CASAS, 1990; CASAS, 1993b). The computation section in the item bank (which can be used to make

customized tests) includes ten subsections under which there are further subsections corresponding to the computation definition in the SCANS competencies (CASAS, 1994a; CASAS, 1994b). The sections include the abilities to demonstrate pre-computation skills and compute using whole numbers, decimals, fractions, percents, ratios and averages. Other categories include using expressions, equations, formulas, measurement skills, statistics, probability, estimation, mental arithmetic, and interpreting data from graphs.

Validity. See CASAS validity under Reading.

Reliability. See CASAS reliability under Reading.

Cornell Institute for Occupational Education

Skills measured. The Arithmetic Computation Test assesses the four arithmetic operations of whole numbers, decimal numbers and fractions. The General Mathematics Test assesses competency in "numeric transformations, . . . simple linear relationships; ratios, proportions; formulas and equations; graphic representations; measurement; estimation; and simple geometry" (CIOE, 1984b, p. 3). There have been 132 objectives specified. Some objectives test knowledge of geometric formulas. Only two objectives involve story problems.

Validity. Content validity is of importance in criterion-referenced tests (CIOE, 1984b). The content specified in the Arithmetic Computation Test is "the complete domain of functional competencies commonly taught in standard mathematics curricula" (CIOE, 1984b, p. 2). The General Mathematics Test samples the more common problem configurations.

Reliability. See CTBS reliability under Reading.

CTB/McGraw-Hill

Skills measured. TABE, Forms 5 and 6, measure computation skills through two tests, Mathematics Computation and Mathematics Concepts and Applications (CTB/McGraw-Hill, 1987; Taylor, 1990). The computation test includes assessment of the four arithmetic operations on whole numbers, decimals, and fractions. Percents and algebraic expressions are included also. The concepts and applications test includes items to assess understanding of numeration, number sentences, number theory, problem solving, measurement, and geometry. Test items use adult context, such as story problems about purchasing or measurements (CTB/McGraw-Hill, 1987). TABE, Forms 7 and 8, have the same two test titles for measuring math skills and concepts for adult life and work (CTB/McGraw-Hill, 1994a). Tasks such as budgeting, comparison shopping, and completing a tax form are provided to which students can apply their mathematical abilities. TABE-WF assesses math in the context of and to the extent utilized in the four general occupational areas for which tests have been developed (CTB/McGraw-Hill, 1994a).

Validity. See CTB/McGraw-Hill validity under Reading.

Reliability. See CTB/McGraw-Hill reliability under Reading.

Curriculum Associates, Inc.

Skills measured. The Brigance Inventory of Essential Skills includes sections on Math Grade Placement, Numbers, Number Facts, Computation of Whole Numbers, Fractions, Decimals, Percents, Measurement, Metrics, Math Vocabulary, and Money and Finance. Number Facts includes the four arithmetic operations. Money and Finance includes computing purchasing savings, managing a checking

account, comprehending a credit arrangement, and application for a credit card (Curriculum Associates, Inc., 1994)

Validity. See validity information under Reading.

Reliability. See reliability information under Reading.

Educational and Industrial Testing Service (EdITS)

Skills measured. The Career Ability Placement Survey (CAPS) includes a section titled Numerical Ability. It measures the ability to "reason with and use numbers and work with quantitative materials and ideas" (EdITS, 1992, p. 1). Most of the problems are computing with given problems on whole numbers, fractions, and decimals. A few brief story problems based on ratios are included (EdITS, 1976). EdITS also sells a test separately from the COPSystem titled TABS (Tests of Achievement in Basic Skills) Mathematics (EdITS, 1993). It is a criterion-referenced test for stated objectives.

Validity. See validity for CAPS under reading.

Reliability. See reliability for CAPS under reading.

Educational Technologies

Skills measured. The skills measured on Skills 2000 are the same as those on TABE, Form 5 and 6.

Validity. TABE has been validated in a general sense, but this software increases the validity for the particular job for which it is being used. Job experts have input data about those skills used most in that job and the software has then selected those items on TABE which match those skills.

Reliability. See TABE reliability under reading.

Educational Testing Service (ETS)

Skills measured. The Quantitative Literacy Test in TALS measures the four computation skills on numbers when embedded in context. Most materials are documents such as tables, charts, graphs, forms, or advertisements. Operations needed are indicated to varying degrees, so the test-taker must determine which numbers to compute and how to compute with them. Answers may require one, two, three or more steps. Sometimes explanations of how to determine the answer are requested.

Validity. Although validity is not directly mentioned in ETS materials, the design of the Quantitative Literacy Test results in assessment of skills very similar to those used in adult work and community situations. The documents are authentic. The skill of finding the numbers in the document, then determining which operations to perform on them, and writing or explaining the answer (ETS, 1991) are more like workplace demands than those which provide the test-taker with the numbers, operations, and multiple choice answers. Two or more steps are necessary to answer the questions in the upper four categories of difficulty. This test was given as a survey to 26,000 adults in 1992 (Kirsch, Jungeblut, Jenkins, Kolstad, 1993).

Reliability. The Alpha coefficients for Forms A and B, Quantitative, were .91 and .88, which are "quite acceptable given the test form lengths" (ETS, 1991, p. 2-5).

The Psychological Corporation

Skills measured. ABLE includes tests for Number Operations and Problem Solving. All three levels of Number Operations assess addition, subtraction,

multiplication, and division using fractions, decimals, and whole numbers. Level 3 includes computation with integers, scientific notation, and powers and roots (The Psychological Corporation, 1987). Problem Solving "measures the ability to determine an outcome, to record and retrieve information, to use geometric concepts, and to measure" (The Psychological Corporation, 1987, p. 7). Everyday practical problems are the context which is used. WRAT-3, another assessment, measures basic knowledge of arithmetic computation.

Validity. Validity information is provided with a purchased test.

Reliability. Reliability information is provided with a purchased test.

Riverside Publishing

Skills measured. TAP assesses computation through Math Concepts and Problem Solving, as well as through Math Computation (Riverside Publishing, 1994). Math Computation measures computing with integers, fractions, decimals, percents, and ratio and proportion in situations of real life for high school students and adults. Math Concepts and Problem Solving assesses skills in estimation, graphs, charts, metric measure, and simple probability and geometry. It also measures "the understanding of fundamental mathematical principles and the development of an appreciation of mathematics in society" (Riverside Publishing, 1994, p. 16).

Validity. See validity of TAP under Reading.

Reliability. See reliability of TAP under Reading.

Skills measured. The Life Skills Applications Mathematics Test measures "computing basic consumer problems; applying principles of percent, interest, and fractions; identifying, estimating, and converting time, currency, and

measurements; and interpreting graphs, charts, and statistics" (Riverside Publishing, 1994, p. 95).

Validity. Validity was not discussed directly. The test was designed to measure "skills that students and adults must use daily" (Riverside Publishing, 1994, p. 95).

Reliability. The reliability coefficients for the mathematics tests were .89 or higher (Riverside Publishing, 1981).

Other assessments

The Canadian Adult Achievement Test (CAAT) includes a section on number operations on all three levels of the test (Taylor, 1990).

Oral Communication

American College Testing Program

Specifications for the Work Keys Speaking assessment are under development and review. It is expected to be completed in 1994 (ACT, 1993).

Comprehensive Adult Student Assessment System

Skills measured. The CASAS Workforce Learning Systems assesses communication including listening, speaking, and writing (CASAS, 1992). The Life Skills and Employability systems also include a performance-based speaking assessment (CASAS, 1993a).

CTB/McGraw-Hill

Skills measured. The Listening and Speaking Checklist is designed for either primary, secondary, or high school level. Based on classroom observation and experience, the teacher uses one checklist for each student. In the speaking area the

teacher rates the student on Speaking Behavior and Participation (CTB/McGraw-Hill, 1994a).

Validity. This checklist was designed to be used with children in school settings. The user assumes the risk for using an assessment for uses other than those for which it was designed (CTB/McGraw-Hill, 1994a).

Reliability. The reliability could be affected by having different teachers making the observations. This checklist was designed to be used with children in school settings. The user assumes the risk for using an assessment for uses other than those for which it was designed (CTB/McGraw-Hill, 1994a).

Curriculum Associates, Inc.

Skills measured. On the Brigance Inventory of Essential Skills the last section of the test is titled Oral Communication and Telephone Skills. This section includes Speaking Skills with oral response and a Speaking Skills Rating Scale to which oral and written responses may by given (Curriculum Associates, Inc., 1994a).

Listening

American College Testing Program

Skills measured. The American College Testing Programs Work Keys System assesses "listening to and understanding work-related messages" (ACT, 1994, p. 2:1). The Work Keys listening assessment is administered via audio tape which contains all directions. Examinees listen to messages and then write down messages based on what they have heard. The written message is scored for content. The same message is scored for writing ability for the Work Keys writing assessment. As the levels increase the spoken messages contain more facts and

require more inferences (ACT, 1994; McLarty, 1992); both the number and accuracy of the facts is scored.

Validity. See ACT validity under Reading.

Reliability. The Listening and Writing assessment was given to 3,319 examinees, 94.5% of whom were high school students. The SPSS-X Reliability procedure was used with "internal consistency and a strict parallel unbiased reliability" (Vansickle, 1992, p. 16) being computed. The coefficients ranged from .74 to .81.

Comprehensive Adult Student Assessment System

The listening assessment as part of the Employability Competency System within CASAS includes listening to an audio tape and answering questions on a paper-and-pencil test (CASAS 1993b; CASAS, 1991a; Sticht, 1990). The Life Skills system also includes a listening test. The Workforce Learning Systems includes a listening assessment as part of the communication test (CASAS, 1992; CASAS, 1993a; CASAS, 1993b).

CTB/McGraw-Hill

Skills measured. The Listening and Speaking Checklist is designed for either primary, secondary, or high school level. Based on classroom observation and experience, the teacher uses one checklist for each student. In the listening area the categories rated are Listening Behavior, Listening Comprehension, and Critical Listening (CTB/McGraw-Hill, 1994a).

Validity. This checklist was designed to be used with children in school settings. The user assumes the risk for using an assessment for uses other than those for which it was designed (CTB/McGraw-Hill, 1994a).

Reliability. The reliability could be affected by having different teachers making the observations. This checklist was designed to be used with children in school settings. The user assumes the risk for using an assessment for uses other than those for which it was designed (CTB/McGraw-Hill, 1994a).

Curriculum Associate, Inc.

Skills measured. The Brigance Inventory of Essential Skills includes a section on Oral Communication and Telephone Skills. Listening and Listening Skills Rating Scale may be responded to orally and in writing (Curriculum Associates, Inc., 1994a).

Riverside Publishing

Skills measured. The Tests of Achievement and Proficiency (TAP) includes a test titled Listening Assessment for TAP/ITED. "Each test level contains six parts: remembering exactly what is heard, identifying word meanings in context, remembering main points and details, distinguishing between fact and opinion, listening to a lecture, and detecting bias" (Riverside Publishing, 1994, p. 16). The test is administered orally.

Validity. See TAP validity under Reading.

Reliability. See TAP reliability under Reading.

Problem Solving

Comprehensive Adult Student Assessment System

Skills measured. A problem solving assessment is included as part of the Workforce Learning Systems within CASAS (CASAS, 1994a; CASAS 1994b; CASAS 1992). There is also an assessment entitled Application of Critical Thinking Skills in Employability (CASAS, 1991a; CASAS, 1993b). Problem

solving, creative thinking skills, and decision-making test items are available for customized tests as listed in the life skills competencies (CASAS, 1994a; CASAS, 1994b).

CTB/McGraw-Hill

Skills measured. "TABE Work-Related Problem Solving (TABE-PS) is an authentic performance assessment that measures a wide range of problem solving competencies that require using basic reading, mathematics, and language skills in a variety of workplace-related challenges"(CTB/McGraw-Hill, 1994b, p. 7). It measures skills in "defining the problem, examining the problem, suggesting possible solutions, evaluating solutions, and extending the meaning of the solution" (CTB/McGraw-Hill, 1994b, p. 7). Assuming a reading level of Grade 6, the test items are based on occupational context and measure higher order thinking skills. Occupation-specific knowledge is not tested. Test results are provided as raw scores or based on a scale. Norms for scoring will be completed in the fall of 1994.

Validity. See CTB/McGraw-Hill validity under Reading.

Reliability. See CTB/McGraw-Hill reliability under Reading.

Self-Management

American College Testing Program

Skills measured. The ACT Work Keys Program is developing and reviewing an assessment on motivation in 1994 (ACT, 1993). Motivation is included in several aspects of the definition of self-management.

Validity. See Work Keys validity under Reading.

Reliability. See Work Keys reliability under Reading.

Comprehensive Adult Student Assessment System

Skills measured. On the CASAS list of life skills competencies, 4.45, 7.1.1, 7.1.2, 7.1.3, and 7.1.4 combine to include most of the definition of self-management in the SCANS report. Corresponding test items are in the bank of test items available for customized tests or may be in the process of being included in standardized tests (CASAS, 1994a, CASAS, 1994b).

Validity. See CASAS validity under Reading.

Reliability. See CASAS reliability under Reading.

Knowing How to Learn

American College Testing Program

Skills measured. The ACT Work Keys Program is developing and reviewing an assessment on learning in 1994 (ACT, 1993). Business and education representatives ranked "ability to learn" as second highest in importance among the skills desired for entry-level workers (McLarty, 1992).

Validity. See Work Keys validity under Reading.

Reliability. See Work Keys reliability under Reading.

Comprehensive Adult Student Assessment System

Skills measured. On the CASAS list of life skills competencies, the skills under 7.4 (Demonstrate study skills) combine to include most of the definition of Knowing How to Learn in the SCANS report (1991). Corresponding test items are in the bank of test items available for customized tests or may be in the process of being included in standardized tests (CASAS, 1994a, CASAS, 1994b).

Validity. See CASAS validity under Reading.

Reliability. See CASAS reliability under Reading.

Oregon State Board of Education, Office of Community College Services

Skills measured. The Learning to Learn assessment developed for the Oregon/Washington project by Northwest Regional Educational Laboratory includes items on personal, interpersonal, and cognitive learning styles and preferences. Competencies were listed under each of the three areas. Open-ended questions which are scored in one of three levels comprise most of the test. They can be given orally or in writing and are based on work scenarios.

Validity. Evidence of validity is in the test design. Competency statements were verified with 268 employers in Oregon and Washington. Item specifications were based on literature and correlated closely with the competencies.

Reliability. Field testing provided item feedback for revision and this will continue. The assessment was recently completed in June 1994.

PESCO International

Skills measured. The Compute-a-Match software includes a learning styles assessment based on the CITE learning styles inventory. It provides an individual's major and minor learning styles with a prescription (PESCO International, 1990).

Teamwork

American College Testing Program

Skills measured. "The Work Keys Teamwork assessment measures the degree of proficiency an examinee demonstrates in choosing behaviors and/or actions that simultaneously support team interrelationships and lead toward the accomplishment of work tasks" (ACT, 1993, p. 5). The test is based on videotaped situations, simple to complex, and examinees select the most appropriate teamwork response.

Validity. See Work Keys validity under Reading.

Reliability. See Work Keys reliability under Reading.

Comprehensive Adult Student Assessment System

Skills measured. On the CASAS list of life skills competencies, the skills under 4.8.1 correspond to the definition of Participates as a Member of a Team in the SCANS report (1991). Corresponding test items are in the bank of test items available for customized tests or may be in the process of being included in standardized tests (CASAS, 1994a, CASAS, 1994b).

Validity. See CASAS validity under Reading.

Reliability. See CASAS reliability under Reading.

Oregon State Board of Education, Office of Community College Services

Skills measured. One of the seven major headings of the competencies employers desire was Group Effectiveness. The three areas under that are Interpersonal, Negotiation, and Teamwork (NWB, 1993). The six competencies listed under Teamwork are measured through such activities as watching a videotape of a team working on a problem. Then open-ended questions are asked about the team skills exhibited by each one. Roles played in the video include facilitator, recorder, mediator, team leader, encouraging brain storming, and suggesting that a vote be taken.

Validity. The competencies which are assessed were verified by 268 employers in Oregon and Washington. Competencies are demonstrated by such activities as observation of what actions and characteristics in an employee teamwork situation assist the team to accomplish its goal (NWB, 1993b).

Reliability. Reliability information was not given. Scoring guidelines were provided for rater reliability (NWB, 1993b).

Leadership

Comprehensive Adult Student Assessment System

Skills measured. On the CASAS list of life skills competencies, the skills under 4.8.5 correspond to the definition of Exercises Leadership in the SCANS report (1991). Corresponding test items are in the bank of test items available for customized tests or may be in the process of being included in standardized tests (CASAS, 1994a, CASAS, 1994b).

Validity. See CASAS validity under Reading.

Reliability See CASAS reliability under Reading.

Oregon State Board of Education, Office of Community College Services

Skills measured. Another of the seven major headings of the competencies employers desire was Influence. The three areas under that are Organizational Effectiveness, Professional Growth Within an Organization, and Leadership (NWB, 1993b). The three leadership competencies are for workers to demonstrate the ability to understand the difference between management and leadership; identify the qualities of a successful leader; and assess their leadership skills and identify areas for improvement (NWB, 1993b).

Validity. The Northwest Workplace Basic competencies were verified by 268 employees for entry-level jobs. They are assessed on the newly designed tests through written scenarios of work situations. Leadership qualities are observed and characterized by test-takers through open-ended questions.

Reliability. Reliability information was not given (NWB, 1993b).

Other Available Assessments

American College Testing Program

The Work Keys System includes assessments on Applied Technology and Locating Information. Both are focused on workplace applications rather than academic situations. Applied Technology measures skill in solving problems of a technological nature such as those involving mechanics, electricity, fluid dynamics, and thermodynamics. Reasoning, rather than mathematics, is tested. Locating Information measures skills in using graphic documents to insert, extract, and apply information. The document complexity and difficulty of the task increase as the level increases.

Comprehensive Adult Student Assessment System

On the CASAS list of life skills competencies, the descriptions correspond very strongly to almost all the others in the SCANS report (1991). Corresponding test items are in the bank of test items available for customized tests or may be in the process of being included in standardized tests (CASAS, 1994a, CASAS, 1994b).

Educational and Industrial Testing Service (EdITS)

Reasoning is one of the SCANS competencies included in the foundational group of thinking skills. CAPS includes a section on Verbal Reasoning. Four or five statements are given and the ability to use deductive reasoning is assessed through four or five items which follow (CAPS, 1976). This is using logic to draw conclusions from given information (SCANS, 1991).

Oregon State Board of Education, Office of Community College Services

The seven major headings in Carnevale's study (1988) for the American Society for Training and Development have had assessments developed for them except for

Chapter III

Conclusions and Recommendations

The problem statement for this library research report is as follows: "What is the relationship between those skills measured by basic skills assessment tools and the competencies desired by employers for their existing hourly employees in the United States?" This chapter will provide a series of conclusions and recommendations to the six research questions presented in Chapter I.

Research Question #1

The first research question was "What are basic skills employers want in their existing hourly employees?"

Conclusion #1 A series of workplace basic skills were identified in the ASTD Report by Carnevale (1988), SCANS (1991), and the Northwest Workplace Basics study (1994). Carnevale's study (1988) listed the skills as learning to learn, reading, writing, computation, listening, oral communication, creative thinking, problem solving, self-esteem, goal setting, motivation, personal and career development, interpersonal skills, negotiation, teamwork, organizational effectiveness, leadership. The SCANS report (1991) listed three foundational categories which included the skills of reading, writing, arithmetic/mathematics, listening, speaking, creative thinking, decision making, problem solving, seeing things in the mind's eye, knowing how to learn, reasoning, responsibility, self-esteem, sociability, self-management, and integrity/honesty. The five competencies of resources, interpersonal, information, systems, and technology included allocating time, money, material, facilities, and human resources; participates as member of a team, teaches others new skills, serves clients and customers,

exercises leadership, negotiates, and works with diversity; and acquires and evaluates information, organizes and maintains information, interprets and communicates information, and uses computers to process information. Also included were understands systems, monitors and corrects performance, improves or designs systems, selects technology, applies technology to task, and maintains and troubleshoots equipment. After careful consideration of the ASTD (1988) results and the Northwest Workplace Basics study (1994) this library research report chose the ten competencies of reading, writing, computation, oral communication, listening, problem solving, self-management, knowing how to learn, teamwork, and leadership as defined in What Work Requires of Schools, A SCANS Report for America 2000 (SCANS, 1991) as the standard. The definitions are for comp tencies as desired at any level in the organization, so the more complex aspects, it is suspected, would very likely not be required for hourly employees.

Recommendation. Use the SCANS Report (1991) as the most reliable source for identifying basic skills in the workplace.

Research Question #2

The second question was "Which assessment tools are available for measuring basic skills of hourly employees in the United States?" To answer this question letters were sent to 24 publishers requesting test information (See Appendix A). Responses were received from twelve publishers. The publishers contacted are presented in Exhibit 1. (Complete mailing addresses, phone numbers, contact persons, and tests available are provided in Appendix B).

Exhibit 1

Publishers Contacted for Adult Basic Skills Assessment Information

Publisher
Addison-Wesley School Division
American College Testing Co. (ACT)
Comprehensive Adult Student Assessment System (CASAS)
Committee on Diagnostic Reading
Conover Company Ltd.
Contemporary Books, Inc.
Cornell Institute for Occupational Education
CTB/McGraw-Hill
Curriculum Associates, Inc.
Educational and Industrial Testing Service (EdITS)
Educational Diagnostic Services, Inc.
Educational Technologies Inc.
Educational Testing Service
Educators Publishing Service, Inc.
HBJ/Psychological Corp.
Houghton Mifflin Co.
Jastak Associates, Inc.
National Assessment Project
Oregon State Board of Education
Office of Community College Services
Progressive Evaluation Systems Company (PESCO International)
Psychological Corporation
Science Research Associates
Scott Foresman and Company
The Riverside Publishing Company

Personal Management for the Job. That area has a resource booklet available. Four of the seven assessments were developed by CASAS and the other two by Northwest Regional Education Laboratory (NWREL). The competencies assessed carry a strong congruency with the SCANS competencies (NWB, 1993b).

Applicability to the Workplace

A model for good employee relationships when administering assessments was described by Geroy and Erwin (1988). The steps followed resulted in a more positive relationship between employer and employee than if the test had been given without a preparation process. Because of legal implications, "no major gatekeeping decision should be based solely on the results of a single standardized test score" (Sticht, 1990, p. 24).

After the needs have been assessed in a workplace the human resource personnel will be better able to design or select curriculum which meets those needs. Many publishers distribute teaching materials for basic skills (NWB, 1994a).

Contemporary Books, Inc. has published a series of curriculum books which correlate to the CASAS competency levels (Contemporary Books, Inc., 1993) The CASAS competency levels can be correlated with the SCANS competency levels (CASAS, 1994a; CASAS, 1994b). A placement assessment is included; the books utilize adult functional context.

Some employers contract with an outside agency to have a customized test created, because the standardized tests do not adequately assess the competencies used in their workplace. It is important to document validity and reliability of a customized test for that particular workplace.

Conclusion #1 Twelve publishers have basic skills assessments available as listed in Appendix B and Table 1. Twenty different assessment systems are available from these twelve publishers.

Recommendation. Consider one of the twenty assessments in Appendix B and Table 1 for standardized testing of adult basic skills. The list will be refined for workplace applications as a result of the discussion of competencies assessed, validity, and reliability.

Research Question #3

Research Question #3 was "What are the skills measured by basic skills tests for adults?"

Conclusion #1 Table 1 shows which of the ten competencies are measured by the twenty assessment systems. The listing is alphabetical by publisher. The largest number of instruments are available for reading, writing, and computation. Assessments are available for all ten competencies.

Table 1

Competencies Measured by the Adult Basic Skills Assessment Systems

Publisher	Test Name	R	W	C	O	L	P	S	K	T	D	H
ACT	Work Keys	x	x	x	x	x		x	x	x		x
CASAS	Life Skills	x	x	x	x	x						
CASAS	Employability Competency System	x	x	x	x	x	x					
CASAS	Workforce Learning Systems	x	x	x	x	x	x					
CASAS	Life Skills Competency List	x	x	x	x	x	x	x	x	x	x	x
Cornell Institute for Occupational Education	CTBS	x		x								
CTB/McGraw-Hill	TABE, Forms 5 and 6	x	x	x								
CTB/McGraw-Hill	TABE, Forms 7 and 8	x	x	x								
CTB/McGraw-Hill	TABE-WF	x	x	x	x	x						
CTB/McGraw-Hill	TABE-PS						x					
Curriculum Assc.	Brigance Diagnostic Inventory of Essential Skills	x	x	x	x	x						
Curriculum Assc.	Brigance Life Skills Inventory	x										
EdITS	CAPS	x	x	x	x							x
EdITS	TABS			x								
Educational Technol.	Skills 2000 (TABE)	x	x	x								
ETS	TALS	x	x	x								
Oregon State Board of Education	BASIS/NWB developed by CASAS for NWB	x	x	x	x	x	x	x	x	x	x	x
PESCO International	VAB (TABE)	x	x	x					x			
The Psychological Corp	BST	x										
The Psychological Corp	ABLE	x	x	x								
The Psychological Corp	IRT	x										
The Psychological Corp	WRAT-3	x	x	x								
Riverside Publishing	TAP	x	x	x		x						
Riverside Publishing	Life Skills Applications	x		x								
Riverside Publishing	Gates-MacGinitie Reading Tests	x										
Riverside Publishing	Iowa Writing Assessment		x									
Riverside Publishing	Business English Test		x									
———	CAAT	x		x								
	Assessments at beginning of curriculum books	?	?	?								
	Software curriculum assmts	?	?	?								
	Alternative assessments including customized assessments	?	?	?								
	Analyzing written reports from the workplace		x									

Note. Key: R=Reading; W=Writing; C=Computation; O=Oral Communication; L=Listening; P=Problem Solving; S=Self-management; K= Knowing How to Learn; T=Teamwork; D=Leadership; H=Other competencies; ?=may include assessments over these competencies

Recommendation. CASAS and the Oregon State Board of Education each offer assessments for the ten competencies and also others. ACT provides assessments for eight of the ten competencies and two others.

Research Question #4

The fourth research question was "What is the validity of the assessment tool and how was it determined?" The documented validity for each assessment system was reviewed in Chapter II. A conclusion will be given for each assessment system and a rating of high, medium, or low validity for the workplace. The ratings are summarized in Table 2 and is presented after the conclusions.

Conclusion #1 Work Keys appears to have a high validity for the workplace because the development process included representatives from small, medium, and large businesses in seven states (ACT, 1993; McLarty, 1992). It includes workplace functional context provided by businesses. The validity data was given by eight job incumbents in one business (McLarty, 1992). This provided a small sample for face validity. No data were provided for content, concurrent, or predictive validity which are recommended for showing validity of a test (Shrock & Coscarelli, 1989).

Recommendation. American College Testing is planning to continue to validate Work Keys because it is so new. Showing concurrent validity (criterion-related validity) by comparing test results of job incumbents with non-incumbents who do not qualify for the job because of lack of basic skills would be convincing evidence of Work Keys' appropriateness for the workplace.

Conclusion #2 CASAS showed all three types of validity recommended by standards established for educational testing in 1985 (CASAS, 1993d), and was

evaluated as an effective program by the U.S. Department of Education (CASAS, 1993c). Its validity is high, as shown in Table 2, because of the practical, everyday materials used in the items, and the 6000-item bank which corresponds to the SCANS skills (CASAS, 1993b; CASAS, 1994a; CASAS, 1994b). The upper level test results correlated to student success on the GED. There were a large number of adult basic education instructors who gave input during development, which also added to the validity (CASAS, 1993d). However, there was no input from business representatives in the assessment development process mentioned in the literature from CASAS. This is a weakness of the CASAS system. The Workforce Learning Systems would have a stronger need for this input than the Life Skills System.

Recommendation. Business feedback to CASAS is important for increased validity in the workplace. Representatives from business being included in future CASAS development efforts would increase the validity even more, especially for the Workforce Learning Systems. Further detail about the U.S. Department of Education's evaluation of CASAS and the reasons for its recommendation would be helpful for employers to determine the validity of particular CASAS systems for their workplace.

Conclusion #2. The Cornell Test of Basic Skills (CTBS) by the Cornell Institute of Occupational Education (CIOE) at Cornell University is a criterion-based test whose validity is based on careful content specification (CIOE, 1984b). But the content for reading comprehension is based on six story lines. Workplace reading is usually documents, charts, and other forms of information. The computation is based on the complete domain of specifications in school curricula, but very few

practical, real-life problems are given (CIOE, 1984b). Scores of test-takers can be compared to various reference groups such as "successful graduates of particular vocational programs" (CIOE, 1984b, p. 1). This provides some concurrent validity, assuming that the successful graduates are also successful in the workplace.

Recommendation. The CTBS has medium validity for the workplace. It is important to consider whether the skills required in reading and math are those actually required in the particular workplace it is used in.

Conclusion #4 The validity for TABE is medium, as shown in Table 2, because it did not include input from business people or adult basic education instructors. The test was based on written educational materials (Taylor, 1990). Employers have found that many employees who have been through the educational system are still lacking in the competencies employers desire. TABE 7 and 8 is an updated version based on suggestions by loyal TABE users (CTB/McGraw-Hill, 1994b). But if the users are educators who still do not understand the need for the SCANS competencies, then TABE 7 and 8 would still have a medium validity for the workplace. The literature did not indicate that TABE-WF included input from businesses (CTB/McGraw-Hill, 1994b).

The assessment for writing does not include a sample of the individual's writing (CTB/McGraw-Hill, 1994a). Instead it is assessed through multiple-choice items which is very unlike the situations experienced in the workplace. The math section includes very few practical problems (CTB/McGraw-Hill, 1987).

Recommendation. Individuals may score well on TABE, but still have problems functioning in the workplace. TABE pinpoints the particular skills which

are lacking for training purposes. After those skills are mastered it is important to use another assessment with practical applications or supplement the workplace basic skills curriculum with many practical applications of reading, writing, and math. Requests from business customers would hopefully result in an improved validation process and improved test.

Conclusion #5 Validity information for Brigance Diagnostic Inventory of Essential Skills was not included in the literature from the test authors, Curriculum Associates. The test was designed for high school students with mental disabilities (Curriculum Associates, Inc., 1994a) and appears to have at least medium validity for adults with mental disabilities. Oral and written responses are included. Context from life and employment situations are used (Curriculum Associates, Inc., 1994a; Curriculum Associates, Inc., 1994b). The writing test includes writing the letters of the alphabet and the listening test includes evidences of listening (Curriculum Associates, Inc., 1994a).

Recommendation. It is recommended that validity information be requested from the publisher. This test is recommended for adults with learning disabilities.

Conclusion #6 CAPS by EdITS has low validity as a workplace basic skills assessment tool. It is an aptitude test and the score is only in relation to other test-takers. It does not indicate what abilities the score reflects (EdITS, 1992; EdITS, 1993). Validity for basic skills testing was not provided by the publisher.

Recommendation. It is recommended that CAPS not be used as a workplace basic skills assessment tool.

Conclusion #7 Skills 2000 by Educational Technologies has medium validity for the workplace like TABE 5 and 6, except it is possibly somewhat higher because

the software program requires input about the particular jobs in the business for which it is being used (Educational Technologies, 1991).

Recommendation. Supplement the test with practical problems and supplement the basic skills training with much functional context from the workplace. Input to the software program designers from businesses could increase the validity of the next version.

Conclusion #8 The Tests of Applied Literacy Skills (TALS) by ETS has a high validity for the workplace, as shown in Table 2, because of the open-ended questions based on adult contextual materials reproduced in their original form (Kirsch, Jungeblut, Jenkins, & Kolstad, 1993). The open-ended questions require test-takers to write an answer, similar to situations in the workplace. The document section of the test includes information in formats similar to those found in businesses. The use of the test with 26,000 individuals in the National Adult Literacy Survey (1993) and its findings also add validity to the test (Kirsch, Jungeblut, Jenkins, & Kolstad, 1993).

Recommendation. TALS is recommended for the workplace for reading, writing, and math. Further studies for concurrent validity would be helpful to employers--comparing the scores of those who have mastered the skills with those who are known not to have mastered them.

Conclusion #9 Northwest Workplace Basics (NWB) has a high validity for the workplace because of the 268 employer and 147 educators, job trainers, or government employees who had input in the development process (NWB, 1993b). The developers followed closely the definitions of the SCANS report in developing

the pioneering assessments for Learning to Learn, Teamwork and Leadership. The tests are so new that concurrent validity evidence has not been gathered.

Recommendation. NWB is recommended for use in the workplace. It is also recommended that concurrent validity evidence be gathered to show that a paper-and-pencil test is valid for interpersonal skills. The test user wonders if the ability to identify who is playing the various team roles in a videotape really corresponds with who is effective in a team situation. Feedback from business users is very important in showing the validity of these assessments.

Conclusion #10 VAB by PESCO International is an aptitude test and is low in validity for workplace basic skills assessment. Only two of the eleven sections are related to the SCANS competencies (PESCO International, 1988). The predictive validity evidence is appropriate and helpful for an aptitude test, but is not adequate for evidence of workplace validity for current employees.

Conclusion #11 The Psychological Corporation provides validity information with a purchased test for the BST, ABLE, IRT, and WRAT-3 (The Psychological Corporation, 1994). These tests may be appropriate for the workplace depending on the context used and skills assessed. A comparison of scores for known masters of the skills with known nonmasters of the skills would provide evidence for the tests having concurrent validity for the skills assessed (Shrock & Coscarelli, 1989). Comparing the skills tested with those required in the job would provide evidence of content validity.

Recommendation. It is recommended that a test be purchased, the validity information read and evaluated for evidence as indicated above.

Conclusion #12 TAP published by Riverside publishing is based on high school curricula (Riverside Publishing, 1994) and would appear to be a valid test for knowledge learned in high school. A book with evidence for validity is available for purchase. Employers have indicated that even those who have graduated from high school often do not have the competencies desired in the workplace. The disparity at this time between high school curriculums and skills employers desire for their hourly employees would indicate that TAP has a low validity for the workplace. The Life Skills Applications Reading Test appears to be more valid because of the use of reading materials adults encounter daily (Riverside Publishing, 1994).

Recommendation. TAP is recommended as perhaps appropriate as a standardized test for high school graduation. It is recommended that the test booklet be purchased by high school districts who want to consider it, and the evidence for validity be evaluated carefully. The Life Skills Applications Reading Test could be valid for assessing reading in the workplace. It is recommended that the test booklet be purchased and the evidence for validity be carefully evaluated.

Conclusion #13 The four assessment systems with high validity for the workplace are Work Keys, CASAS, TALS, and NWB as shown in Table 2.

Recommendation. These four assessment systems are recommended for a standardized workplace basis skills assessment based on their high validity for the workplace. Table 2 summarizes validity and reliability information for the adult basic skills assessment systems.

Table 2

Validity and Reliability of the Adult Basic Skills Assessment Systems

Publisher	Test name	Validity	Reliability
ACT	Work Keys	High	Strong
CASAS	CASAS	High	Medium
Cornell Institute for Occupational Education	CTBS	Medium	Strong
CTB/McGraw-Hill	TABE	Medium	Medium
Curriculum Assc.	Brigance Diagnostic Inventory of Essential Skills	Not provided	Not provided
EdITS	CAPS	Low	Not provided
Educational Technol.	Skills 2000 (TABE)	Medium	Medium
ETS	TALS	High	Medium
Oregon State Board of Education	BASIS/NWB developed by CASAS for NWB	High	Not provided
PESCO International	VAB (TABE)	Low	Weak
The Psychological Corp	BST, ABLE, IRT, WRAT-3	Not provided	Not provided
Riverside Publishing	TAP	Low	Not provided
Riverside Publishing	Life Skills Applications	Medium	Medium

Research Question #5

Research Question #5 was "What is the reliability of the assessment tool and how was it determined?" The documented reliability for each assessment was reviewed in Chapter II. A conclusion for each assessment system will be given and is summarized in Table 2. Strong reliability is necessary for high validity (Shrock & Coscarelli, 1989).

Conclusion #1 The Work Keys reliability information is strong, as shown in Table 2, because it shows that the assessment consistently (95% of test-takers) categorizes high school test takers into one of five categories (Vansickle, 1992).

Recommendation. This test is recommended because of the strong reliability evidence. Evidence showing that the test consistently categorizes hourly employees would add even more strength to the reliability data.

Conclusion #2 CASAS reliability were given in terms of KR-20 coefficients which are used for norm-referenced tests (CASAS, 1993d). CASAS is a competency-based assessment. The phi coefficient, the agreement coefficient, and the kappa coefficient for test-retest data are recommended for competency-based or criterion-referenced tests (Shrock & Coscarelli, 1989). Some tests provide both norm-referenced and criterion-referenced data. The KR-20 values of .80 and higher (CASAS, 1993d) looked strong for internal consistency, but they did not show the consistency with which test-takers were rated. The reliability is rated medium.

Recommendation. Reliability information would be stronger if the Work Keys approach were utilized. Feedback from business will encourage CASAS to gather this more understandable form of reliability evidence.

Conclusion #3 The reliability evidence for the Cornell Test of Basic Skills (CTBS) was based on comparing the results of two-halves of each type of test. The correlations of .96 to .99 (CIOE, 1984b) show a strong consistency or reliability in how the test measures.

Recommendation. CTBS shows strong reliability.

Conclusion #4 TABE tests by CTB/McGraw-Hill used KR-20 statistics to show internal consistency. Internal consistency shows how different parts of the test measure consistently. The users would like to know if the test consistently categorizes the test-taker through test-retest data or split-half reliability (Shrock & Coscarelli, 1989). This was not given. The consistency of parallel forms, such as Forms 5 and 6, was not shown (Kramer & Conoley, 1992).

Recommendation. Data for showing test reliability for TABE is not adequate for the user to determine if there is sufficient consistency of the test results. The reliability is medium, as shown in Table 2.

Conclusion #5 Reliability data for the Brigance Diagnostic Inventory of Essential Skills by Curriculum Associates, Inc. was not given with the test information.

Recommendation. Users should request reliability data from Curriculum Associates, Inc. before buying multiple copies of the assessment. Analysis of the data to determine if it shows how consistent the test results are for individual test-takers should be conducted.

Conclusion #6 No information on reliability for CAPS was provided by EdITS.

Recommendation. Users should request reliability data from EdITS before buying multiple copies of the assessment. Analysis of the data should be conducted to determine if it shows how consistent the test results are for individual test-takers.

Conclusion #7 The reliability of Skills 2000 by Educational Technologies (Educational Technologies, 1991) is the same as the reliability of TABE--medium. Conclusion #4 explains the weakness of the TABE reliability data.

Conclusion #8 TALS by Educational Testing Service (ETS) gives the reliability data in terms of coefficient alpha, a norm-referenced reliability statistic for showing internal consistency of what the items measure (Shrock & Coscarelli, 1989). These coefficients were strong at .89 or above (ETS, 1991). This does not indicate how consistently the test provides results for the same test-taker, so the reliability is rated medium, as shown in Table 2.

Recommendation. Users of TALS should request data showing test-retest score consistency from ETS. This is an important part of showing strong validity.

Conclusion #9 Reliability information was not provided for Northwest Workplace Basics assessments. They were completed in June 1994.

Recommendation. Users should request that reliability data be provided when the test-retest studies have been completed.

Conclusion #10 Reliability data for VAB by PESCO International was provided by indicating that the strong face validity of the test will motivate test-takers to perform consistently well (Loch, 1992). No data was provided.

Recommendation. Users should request reliability data from PESCO International before buying multiple copies of the assessment. Analysis of the data to determine if it shows how consistent the test results are for individual test-takers should be conducted.

Conclusion #11 Reliability information for the BST, ABLE, and WRAT-3 is provided with a purchased test (The Psychological Corporation, 1994). Reliability of the IRT was based on comparisons of vocational education students and technical trainees. This seems to be concurrent validity rather than reliability data.

Recommendation. Users should request reliability data from the Psychological Corporation before buying multiple copies of an assessment. Analysis of the data to determine if it shows how consistent the test results are for individual test-takers should be conducted.

Conclusion #12 For TAP by Riverside Publishing a research handbook on the validity, reliability, and test characteristics of TAP is available for purchase. The KR-20 reliability coefficients for the Life Skills Applications Reading Test were .85 or higher which appears strong. The KR-20 coefficients indicate internal consistency, not test-retest consistency. The reliability rating is medium.

Recommendation. Users should request a research handbook from Riverside Publishing before buying multiple copies of TAP. Users should request that reliability studies be conducted for the Life Skills Applications Reading Test.

Conclusion #13 Work Keys has the strongest reliability data, as shown in Table 2. The others use statistics to show internal consistency for norm-referenced tests or have not provided reliability data.

Recommendation. Requests from potential buyers for reliability data could cause test-retest consistency data to be provided by more publishers. It is important for potential buyers to request and analyze reliability data before making multiple assessment purchases.

Research Question #6

The last question to be answered is the sixth question, "Which assessment tools are most applicable to the workplace for measuring the competency it was designed to measure?" The conclusions will correspond to the ten competencies for which assessments were discussed in Chapter II.

Conclusion #1 The definition of reading in the Secretary's Commission on Necessary Skills (SCANS, 1991) is as follows: "locates, understands and interprets written information in prose and documents--including manuals, graphs, and schedules--to perform tasks; learns from text by determining the main idea or essential message; identifies relevant details, facts, and specifications; infers or locates the meaning of unknown or technical vocabulary; and judges the accuracy, appropriateness, style, and plausibility of reports, proposals, or theories of other writers" (SCANS, 1991, p. C-1). Some of the assessments test more thoroughly according to the definition than others.

The reading skills in Work Keys include all those in the SCANS definition except "judges the accuracy, appropriateness, style, and plausibility of reports, proposals, or theories of other writers" (SCANS, 1991). This is probably appropriate since Work Keys was designed to measure skills for entry-level jobs.

The CASAS reading assessments are strong in adult functional context. Most of the SCANS definition is included except "judges the accuracy, appropriateness, style, and plausibility of reports, proposals, or theories of other writers" (SCANS, 1991).

The Cornell Test of Basic Skills for reading comprehension does not include locating, understanding and interpreting manuals, graphs, and schedules. Reading graphs and charts is part of the mathematics test. The reading test does not include inferring or locating "the meaning of unknown or technical vocabulary" (SCANS, 1991, p. C-1). It also does not include the part in the SCANS definition which reads "judges the accuracy, appropriateness, style, and plausibility of reports, proposals, or theories of other writers" (SCANS, 1991, p. C-1). This last part of the definition would probably be appropriate for tests of higher level jobs.

TABE, Forms 5 and 6, for reading do not include reading documents such as manuals, graphs and schedules for the purpose of performing tasks. They also do not include inferring or locating the meaning of technical vocabulary (CTB/McGraw-Hill, 1987). Some questions about the author's point of view in a prose passage are included, but "judging the accuracy, appropriateness, style, and plausibility of reports, proposals, or theories of other writers" (SCANS, 1991, p. C-1) is not adequately assessed.

TALS by ETS assesses the first aspect of the SCANS definition of reading very clearly. It also clearly assesses "identifies relevant details, facts, and specifications" (SCANS, 1991, p. C-1). The assessment of "determining the main idea or essential message" (SCANS, 1991, p. C-1) is much less clear, as is "infers or locates the meaning of unknown or technical vocabulary" (SCANS, 1991, p. C-1). Judging the plausibility of reports is not assessed.

Compute-a-Match includes the VAB which is a norm-referenced aptitude test, rather than an assessment of basic skills. The Compute-a-Match system incorporated TABE and scanner scoring of that assessment for basic skills testing. This system seems most appropriate for job placement agencies rather than for employers wanting to increase the basic skills of their existing employees since its focus is aptitudes. Another aptitude test, CAPS (published by EdITS) also seems more appropriate for the job placement agencies.

Recommendation. The strongest reading assessments for the workplace seem to be Work Keys, CASAS, and TALS because of adult functional context, input from businesses, and adherence to the SCANS definition of reading skills which employers desire.

Conclusion #2 The definition of writing in the Secretary's Commission on Achieving Necessary Skills is as follows: "Communicates thoughts, ideas, information, and messages in writing; records information completely and accurately; composes and creates documents such as letters, directions, manuals, reports, proposals, graphs, flow charts; uses language, style, organizations, and format appropriate to the subject matter, purpose, and audience. Includes supporting documentation and attends to level of detail; checks, edits, and revises

for correct information, appropriate emphasis, form, grammar, spelling, and punctuation" (SCANS, 1991, p. C-1). The assessments vary in how much of the definition is tested.

The writing skills in Work Keys includes all those in the SCANS definition except "composes and creates documents such as letters, directions, manuals, reports, proposals, graphs, flow charts" (SCANS, 1991, p. C-1) and "includes supporting documentation and attends to level of detail" (SCANS, 1991, p. C-1). These skills seem to be those which are above the entry-level employee whose skills are being assessed by Work Keys through writing messages from an audio tape.

CASAS includes a performance-based writing assessment in the Life Skill and Employability systems.

The three TABE language tests assess the ability to edit for form, grammar, spelling, and punctuation, but do not include the other aspects of writing in the SCANS definition.

Writing is not directly assessed by TALS but several parts of the writing definition could be observed. Communicating in writing, recording information accurately, and editing for grammar, spelling and punctuation can be observed in the answers written for the open-ended questions.

Recommendation. The three assessments which require the test-taker to write sentences, paragraphs, or letters are stronger that the others which use multiple-choice to show writing skills. Work Keys, CASAS, and TALS are recommended for these reasons.

Conclusion #3 Computation (arithmetic) and mathematics are defined by the Secretary's Commission on Necessary Skills (SCANS, 1991) as follows: "Performs basic computations; uses basic numerical concepts such as whole numbers and percentages in practical situations; makes reasonable estimates of arithmetic results without a calculator; and uses tables, graphs, diagrams, and charts to obtain or convey quantitative information." "Approaches practical problems by choosing appropriately from a variety of mathematical techniques; uses quantitative data to construct logical explanations for real world situations; expresses mathematical ideas and concepts orally and in writing; and understands the role of chance in the occurrence and prediction of events" (p. C-1). The basic skills assessment tools test the competencies in the definition to varying degrees.

The applied mathematics assessment in Work Keys included all the skills in the arithmetic definition of the SCANS report except "makes reasonable estimates of arithmetic results without a calculator" (SCANS, 1991, p. C-1). This skill may be used by examinees to increase the speed of completing their test, but since calculators are allowed, it is not clear whether examinees made the estimates themselves.

CASAS math test clearly assesses the skills under arithmetic; all the mathematics definition is assessed except expressing math ideas orally.

The Cornell Test of Basic Skills for mathematics assesses computations for whole numbers and percentages, but not in practical situations. The estimations are numerical problems and rounding, rather than deriving information from a written description. "Reading charts and graphs" is included, but it is not required that they be used to obtain or convey quantitative information. Not included is the skill of

approaching practical problems by choosing from a variety of mathematical techniques and using data to construct explanations orally and in writing (CIOE, 1984b; SCANS, 1991). Measurement transformation, solving linear equations, and geometric problems are included. These must be used on the job for this test to be a valid one for that job.

TABE, Forms 5 and 6, math tests assess the arithmetic SCANS definition, but are weak in supplying practical situations in the items, especially in an employment context. The mathematics definition is assessed only partially in the aspect of "approaches practical problems by choosing appropriately from a variety of mathematical techniques" (SCANS, 1991, p. C-1). Employment context is not included and the ability to explain real world problems using mathematical ideas is not assessed.

The skills of arithmetic are assessed in TALS very clearly, as are mathematical skills as defined in SCANS. Expressing mathematical ideas is done in writing but not orally. The role of chance is not included. TALS is very strong in providing practical applications and requesting explanations of real world situations quantitatively.

Recommendation. Work Keys, CASAS and TALS are recommended because they assess in an applications approach those computation skills used most in the workplace.

Conclusion #4 Oral communication or speaking is defined by the Secretary's Commission on Necessary Skills (SCANS, 1991) as follows: "Organizes ideas and communicates oral messages appropriate to listeners and situations; participates in conversation discussion, and group presentations; selects an appropriate medium

for conveying a message; uses verbal language and other cues such as body language appropriate in style, tone, and level of complexity to the audience and the occasion; speaks clearly and communicates a message; understands and responds to listener feedback; and asks questions when needed" (SCANS, 1991, p. C-1).

Recommendation. The CASAS performance-based speaking assessment seems the most valid of those listed. Work Keys Speaking assessment will be another one to strongly consider when it is completed in 1994.

Conclusion #5 Listening is defined by the Secretary's Commission on Achieving Necessary Skills (SCANS, 1991) as follows: "Receives, attends to, interprets, and responds to verbal messages and other cues such as body language in ways that are appropriate to the purpose; for example, to comprehend; to learn; to critically evaluate; to appreciate; or to support the speaker" (SCANS, 1991, p. C-1). The five listening assessments test this definition to varying degrees.

The listening skills in Work Keys includes all those in the SCANS definition except assessing response to body language cues. Listening and attending to the speaker with non-verbal support in not assessed, because an audio tape is used. For practical reasons assessing the verbal and voice non-verbal cues is probably adequate.

CASAS listening assessment is given with an audio tape and so has the same weaknesses as the Work Keys listening assessment.

The listening assessment for TAP is administered orally and so would probably assess most of the SCANS definition.

Recommendation. Work Keys, CASAS, and TAP are recommended because they involve listening, then writing to indicate what has been heard and understood.

Conclusion #6 Problem solving is defined by the Secretary's Commission on Necessary Skills as follows: "Recognizes that a problem exists (i.e., there is a discrepancy between what is and what should or could be), identifies possible reasons for the discrepancy, and devises and implements a plan of action to resolve it. Evaluates and monitors progress, and revises plan as indicated by findings" (SCANS, 1991, p. C-1). There are two new tests for this competency.

Recommendation. Both CASAS and TABE-PS assessments are recommended for Problem Solving. Data from users given to the test designers will help improve these pioneering assessments.

Conclusion #7 Self-management is defined by the Secretary's Commission on Necessary Skills as follows: "Assesses own knowledge, skills, and abilities accurately; sets well-defined and realistic personal goals; monitors progress toward goal attainment and motivates self through goal achievement; exhibits self-control and responds to feedback unemotionally and non-defensively; is a 'self-starter'" (SCANS, 1991, p. C-1). Both of the self-management assessments have been recently developed.

Recommendation. Both Work Keys and CASAS assessments are recommended for Self-Management. Data from users given to the test designers will help improve these very new assessments.

Conclusion #8 Knowing How to Learn is defined by the Secretary's Commission on Achieving Necessary Skills as follows: "Recognizes and can use learning techniques to apply and adapt new knowledge and skills in both familiar and changing situations. Involves being aware of learning tools such as personal learning styles (visual, aural, etc.), formal learning strategies (note taking or

clustering items that share some characteristics), and informal learning strategies (awareness of unidentified false assumptions that may lead to faulty conclusions)" (SCANS, 1991, p. C-2). There were four assessments described which test Knowing How to Learn.

Recommendation. Work Keys, CASAS, and NWB assessments are recommended for Knowing How to Learn because of the input of businesses and adult basic education teachers. Data from users given to the test designers will help improve these pioneering assessments.

Conclusion #9 Teamwork is defined by the Secretary's Commission on Necessary Skills as follows: "Works cooperatively with others and contributes to group with ideas, suggestions and effort" (SCANS, 1991, p. B-1). The three teamwork assessments test for knowledge about the roles involved in teamwork.

Recommendation. Work Keys, CASAS, and NWB assessments are recommended for Teamwork. They test for knowledge about teamwork roles rather than whether someone actually does work cooperatively with others. Data from users to the test designers will help improve these very new assessments.

Conclusion #10 Leadership or Exercises Leadership is defined by the Secretary's Commission on Necessary Skills as follows: "Communicates thoughts, feelings, and ideas to justify a position, encourages, persuades, convinces, or otherwise motivates an individual or groups, including responsibly challenging existing procedures, policies, or authority" (SCANS, 1991, p. B-1). The two assessments for leadership were based on written questions.

Recommendation. Both CASAS and NWB assessments are recommended for Leadership. Data from users will help improve these pioneering assessments.

Conclusion #11 Other competencies identified by employers also have assessments available to establish the need for instruction. Four publishers have developed assessments for other skills included in the Secretary's Commission on Necessary Skills (SCANS, 1991).

Recommendation. Work Keys, CASAS, CAPS, and NWB are all recommended as pioneering efforts in the other SCANS competencies.

Conclusion #12 It may seem desirable by some to use one system for workplace basic skills assessment in their organization. Some of the systems correspond more closely with the skills employers desire their existing hourly employees to have than others.

Recommendation. Overall Work Keys, CASAS, TALS, and NWB are the recommended assessment systems for the workplace. The Brigance Inventory by Curriculum Associates would be helpful for assessing individuals who score in the lowest levels or who have mental disabilities. Tables 3 through 13 are a summary of some of the factors affecting which assessment systems were chosen for recommendation. Table 3 shows which reading assessments had business input during the design process and which include workplace reading samples. Table 4 shows which writing assessments require a writing sample. Tables 5 through 13 show factors affecting workplace validity for each of the other competencies.

Table 3

Workplace Basic Skills Assessment Tools for Reading, Whether It Has Business Input, and Whether Workplace Reading Samples are Included

Reading		
Test Name	Business input and context	Workplace Reading Samples
Work Keys	x	x
CASAS		x
CTBS		
TABE, Forms 5 and 6		
TABE, Forms 7 and 8		x
TABE-WF		x
Brigance Diagnostic Inventory of Essential Skills		x
Brigance Life Skills Inventory		
CAPS		
Skills 2000 (TABE)		
TALS		x
BASIS/NWB	x	?
VAB (TABE)		
BST	x	x
ABLE	x	x
IRT		x
WRAT-3		
TAP		
Life Skills Applications		
CAAT		x
Gates-MacGinitie Reading Tests		
Assessments at beginning of curriculum books		?
Software curriculum assessments		?
Alternative assessments		?

Table 4

Workplace Basic Skills Assessment Tools for Writing and Whether It Requires a Writing Sample

Writing

Test Name	Requires Writing Sample
Work Keys	x
Workforce Learning Systems	x
Life Skills	x
Employability	x
TABE, Forms 5 and 6	
TABE, Forms 7 and 8	
TABE-WF	
Brigance Inventory of Essential Skills	x
CAPS	
Skills 2000 (TABE)	
TALS	x
ABLE	
WRAT-3	
TAP	
Iowa Writing Assessment	x
Business English Test	
Analyzing written reports from the workplace	x

Table 5

Workplace Basic Skills Assessment Tools for Computation, Whether It Includes Practical Problems, and Whether It Includes Graphs and Charts

Computation

Test Name	Includes practical problems	Includes graphs or charts
Work Keys	x	x
Workforce Learning Systems	x	?
Employability Competency System	x	x
CTBS		
TABE, Forms 5 and 6	x	
TABE, Forms 7 and 8	x	
TABE-WF	x	?
Brigance Inventory of Essential Skills	x	
CAPS		
TABS		
Skills 2000	x	
TALS	x	x
ABLE	x	
WRAT-3		
TAP		
Life Skills Applications	x	x
CAAT		

Table 6

Workplace Basic Skills Assessment Tools for Oral Communication and Whether It Includes Speaking

Oral Communication or Speaking	
Test Name	Includes speaking
Work Keys	?
Employability Competency System	x
Life Skills	x
Workforce Learning Systems	x
Listening and Speaking Checklist	
Brigance Inventory of Essential Skills	x

Table 7

Workplace Basic Skills Assessment Tools for Listening and Whether It Includes Evidence of Listening

Listening	
Test Name	Includes evidence of listening
Work Keys	x
Employability Competency System	x
Life Skills	x
Workforce Learning Systems	x
Listening and Speaking Checklist	
Brigance Inventory of Essential Skills	x
TAPS	x

Table 8

Workplace Basic Skills Assessment Tools for Problem Solving and the Year It Was Developed

Problem Solving	
Test Name	Year Developed
Employability Competency System	'92
Workforce Learning Systems	'92
TABE-PS	'94

Table 9

Workplace Basic Skills Assessment Tools for Self-Management and the Year It Was Developed

Self-Management	
Test Name	Year Dev'd
Work Keys	'94
Life Skills Competency List	'94

Table 10

Workplace Basic Skills Assessment Tools for Knowing How to Learn and the Year It Was Developed

Knowing How to Learn	
Test Name	Year Dev'd
Work Keys	'94
Life Skills Competencies	'94
Northwest Workplace Basics (NWB)	'94
Compute-A-Match	'90

Table 11

Workplace Basic Skills Assessment Tools for Teamwork and the Year It Was Developed

Teamwork	
Test Name	Year Dev'd
Work Keys	'93
Life Skills Competencies List	'94
NWB	'94

Table 12

Workplace Basic Skills Assessment Tools for Leadership and the Year It Was Developed

Leadership	
Test Name	Year Dev'd
Life Skills Competencies List	'94
NWB	'94

Table 13

Workplace Basic Skills Assessment Tools for Other Competencies, Its Business Input, and the Competency Tested

Others

Test Name	Business input and context	Competency Tested
Work Keys	x	Applied Techn., Locating Info
Life Skills Competencies List		SCANS
CAPS		Verbal Reasoning
NWB	x	SCANS

Recommendations for Further Research

Further research could collect data about the experiences of businesses who have utilized the assessments and their employees' reactions. The human resources process used in employee relationships and employees' response could be documented. Those could be compared to the process and reactions in the study by Geroy and Erwin (1988). The benefits and disadvantages of utilizing the assessments to determine needs in the workplace as experienced by businesses could also be documented.

A follow-up study to this research could be done in two years to see what additional assessments have been developed and what modifications have been made to the assessment systems in this report. The increased validity and reliability of the changes could be documented. The question of whether or not paper-and-pencil assessments are appropriate for skills, such as problem-solving, self-management, knowing how to learn, teamwork, and leadership, could also be investigated.

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Appendix A

Letter to Publishers

3118 Rockwood Drive
Fort Collins, CO 80525-2846
Telephone: (303) 223-1024
March 9, 1994

Cornell Institute for Occupational Education
The New York State College of Agriculture
and Life Sciences
Stone Hall
Cornell University
Ithaca, NY 14853

Cornell Institute for Occupational Education:

In completion of the requirements for my Master's Degree in Adult Education, I am writing a library research paper on "What is the relationship between those skills measured by basic skills assessment tools and the SCANS competencies desired by employers for their semi-skilled and unskilled employees in the United States?" I am collecting information about tests which measure the skills of reading, writing, computation, oral communication, listening, problem solving, self-management, learning to learn, teamwork, and leadership. This paper is of interest to personnel from two community colleges, continuing education at Colorado State University, and a workplace basic skills consulting firm. I will write a summary article and pursue publication opportunities. Could you send me information about the skills measured by the ABLE, APL, BSA, IRT, MAT, and other tests you have developed to measure any of the skill areas listed above in the workplace for

purposes of employee training? Information on determination of the skills tested, reliability, validity, and customer satisfaction would be helpful. Thank you for your kind and timely response to my request.

Sincerely,

Evelyn Grace

Appendix B

Publishers Contacted for Adult Basic Skills Assessments

Publisher, Address, and Phone Number	Test?	Test Name
Addison-Wesley School Division Rte 128 Reading, MA 01867 1-800-521-0011 or (617) 944-3700	N	
American College Testing Co. (ACT) Sherry Child P.O. Box 168 Iowa City, IA 52243 (319) 337-1410 OR Tom Kilijanek American College Testing Co. Mountain/Plains Regional Office 3131 S. Vaughn Way, Suite 218 Aurora, CO 80014-3507 (303) 337-3273	Y	Work Keys
Comprehensive Adult Student Assessment System Jane Eguez CASAS Operations Manager 8910 Clairemont Mesa Blvd. San Diego, CA 92123 (619) 292-2900, ext. 325	Y	CASAS

Committee on Diagnostic Reading	RTS	
Conover Company Ltd. P.O. Box 155 Omro, WE 54963 1-800-933-1933	N	
Contemporary Books, Inc. Joan Conover 180 North Michigan Avenue Chicago, IL 60601 (312) 540-4561 or 1-800-621-1918	N	
Cornell Institute for Occupational Education The New York State College of Agriculture and Life Sciences Stone Hall Cornell University Ithaca, NY 14853	Y	CTBS
CTB/McGraw-Hill 1221 Avenue of the Americas New York, NY 10020 1-800-338-3987 (college)	N	see next entry

CTB/McGraw-Hill Del Monte Research Park 2500 Garden Road Monterey, CA 93940-5380 1-800-538-9547 or 1-800-334-7344 or 1-800-282-0266 OR Anne Bradley/Teddy Rocke CTB/McGraw-Hill 10200 Pioneer Blvd., Suite 200 Santa Fe Springs, CA 90670-3715 (310) 946-5672	Y	TABE
Curriculum Associates, Inc. 5 Esquire Road North Billerica, MA 01862-2589 (508) 667-?000	Y	Brigance Diagnostic Inventory
Educational and Industrial Testing Service (EdITS) Lisa Lee P.O. Box 7234 San Diego, CA 92107	Y	CAPS
Educational Diagnostic Services, Inc. P.O. Box 347 Valparaiso, IN 46383	RTS	

Educational Technologies Inc. 1007 Whitehead Road Ext. Trenton, NJ 08638 (609) 882-2668	Y	Skills 2000 Software
Educational Testing Service Princeton, NJ 08541-6108 (609) 771-7243 Mary Michaels (609)734-5891 Order TALS from this publisher: Simon & Schuster Workplace Resources P.O. Box 1230 Westwood, NJ 07675-9855 (800) 223-2348 to open an account (800) 223-2336 to place orders	Y	TALS
Educators Publishing Service, Inc. 75 Moulton Street Cambridge, NA 02138 1-800-225-5750	N	
HBJ/Psychological Corp.	RTS	
Houghton Mifflin Co.	RTS	

Jastak Associates, Inc. P.O. Box 3410 Wilmington, DE 19804-0250 Attention: Barbara (302) 652-4990	Y	?
National Assessment Project	RTS	
Oregon State Board of Education Office of Community College Services Sharlene Walker 255 Capitol St., NE Salem OR 97310-0203 (503) 378-8648, ext. 368	Y	NWB-- Northwest Workplace Basics
Progressive Evaluation Systems Company (PESCO International) (formerly Pleasantville Educational Supply Corporation) Jean Blackman 21 Paulding Street Pleasantville, NY 10570 1-800-431-2016 (914) 769-4266	Y	Compute-A-Match
Psychological Corporation (Harcourt Brace and Company) P.O. Box 839954 San Antonio, TX 78283-3954 1-800-228-0752 (Customer Serv. Dpt.)	Y	ABLE, Clerical BST, IRT, WRAT-3

Science Research Associates 155 North Wacker Drive Chicago, IL 60606 1-800-621-0476	N	
Scott Foresman and Company 1900 East Lake Avenue Glenview, IL 60025 (708) 729-3000 Sold ABE tests to Glencoe which is now part of McGraw-Hill	N	
The Riverside Publishing Company (a Houghton Mifflin company) 8420 Bryn Maur Avenue Chicago, IL 60631 (800) 323-9540	Y	TAPS, BET, WRAT-3, Gates-Mac Ginitie Reading, Life Skills Appln.

Note: RTS = Letter was returned to sender.

Appendix C

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