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ABSTRACT

The Job Literacy Project used the same adult literacy framework as the National Assessment for Educational Progress (NAEP) research and began the process of applying the framework to the world of work. The NAEP framework consisted of three scales: prose, document, and quantitative. The project tested a new methodology called Job Literacy Analysis, a modification of the job analysis procedures. The five jobs selected for study were entry-level positions in three clusters: service (food service worker, nurse assistant), administrative support (secretary, word processor), and mechanics, installers, repairers (data processing equipment repairer). Job Literacy Analysis resulted in a job literacy description, which included a representative collection of the most important materials required for competent performance on the job and the relevant (linked) tasks associated with those materials. Actual literacy materials used by job incumbents and information about how they are used were gathered during personal interviews. The materials were analyzed and reduced to a representative set of materials. The draft job literacy description was reviewed by job experts and revised. A survey containing literacy materials, related tasks, and rating scales regarding use and importance of materials and tasks was distributed nationally to verify experts' judgments. The important literacy materials and related tasks were included in the final job literacy description. (Contains 26 references.) (YLB)

Identifying the Literacy Requirements of Jobs

and

Job Literacy Analysis: A New Methodology

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Summary Version

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I. Introduction

It is becoming increasingly clear why workplace literacy is an issue of great concern for employers today. Firms are finding that the problem they are facing is not one of selection, but instead one of a decreasing entry-level labor pool that is becoming more limited in its skill level. Evidence abounds indicating the severity of the situation. For example, in 1987 Nynex had to test 57,000 applicants in order to fill 2,100 positions for operators and repair technicians (Greenberg & Beilinson, 1989). The ratio of individuals tested to individuals hired was 27 to 1. At an advertising agency in Minneapolis the ratio of applicants to those qualifying was 20 to 1 for secretaries and 10 to 1 for supply and mail clerks (Gold, 1989).

The supply of new workers between 16 and 24 years of age is dwindling due to the decline in birthrates after 1960. And recent estimates indicate that about 27 million adults in the United States can be considered functionally illiterate, unable to read, write, calculate, or solve problems at a level that enables them to perform their job (Goddard, 1989; Gordon, Ponticell & Morgan, 1989).

Specifically, Workforce 2000, the well-known 1987 study from the Hudson Institute, indicated that 25 million workers need to improve their basic skills by 40 percent in order to meet the nation's work force requirements by the year 2000. The study also predicted that by the end of the century a bare 10 percent of the entry-level work force will be able to solve for "x" in a simple algebraic equation. And the National Assessment for Educational Progress (NAEP) studies that have been conducted by Educational Testing Service (ETS) (Kirsch & Jungeblut, 1986) have shown that most young adults have basic literacy skills but are limited in their application of higher-level skills or strategies. Other recent studies have indicated that half of our country's industrial employees read at or below the eighth-grade level (Zemke, 1989). At the same time, literacy requirements of jobs are increasing. About 70 percent of the reading material sampled in a cross section of existing jobs is written between the 9th- and 12th-grade

level (Mikulecky, 1982; Mikulecky, 1988; Rush, Moe & Storlie, 1986; and Sticht, 1982). The Hudson Institute reports that among the newest jobs emerging in the country, only 27 percent require lower literacy skill levels, while 41 percent require higher literacy skill levels (Johnston & Packer, 1987).

Many other sources could be referenced to support these findings. It is clear, though, that the level of skills in the entry-level labor force is decreasing while job requirements are becoming more and more complex.

For these reasons, employers are beginning to become more involved and to embrace the literacy problem confronting the United States and its employees. One recent article pointed out that "employee basic skills is here with us to stay as an issue, and we are going to have to devote thinking and resources to it from now on" (Jurmo, Wiggenhorn, Packer & Zeigler, 1989). In the last few years, training in basic skills has been on the rise. In 1986 companies in the United States spent about $200 million on basic skills training; in 1989 they spent about $300 million (Carnevale & Gainer, 1990). One out of three American companies provides some form of basic skills training (Gold, 1989). In fact, a report published this year by the American Society for Training and Development revealed that 22 percent of major employers offer basic training in reading, 41 percent in writing, and 31 percent in arithmetic (1990).

Although emphasis on literacy in the workplace dates back to the 1960s, when the American Right to Read effort stressed the critical role of literacy in rendering an individual employable, most major research projects in the United States have been undertaken only in the last few years (for a summary of these, see Norback & Rosenfeld, 1989; and Norback, Rosenfeld & Wilson, 1990). The notable exceptions, representing well-known research in the area broadly referred to as workplace literacy, are the work of Tom Sticht (e.g., Sticht, 1984, 1970, 1972, 1974,

1975, 1976, 1978), which focused on the military, and, more currently, the work of Larry Mikulecky and Irwin Kirsch.

Sticht's work encompassed many issues relating to the literacy level of individuals in various military occupational specialties (MOSs) in the Army. He researched and developed job reading task tests and studied their use in enhancing the literacy levels of Army personnel. He stressed the need for functional, job-related literacy training and found that adults learned job-related reading more quickly than general reading skills. Sticht recommended redesigning literacy materials used on the job and using audio materials in order to decrease the gap between the average readability level of publications used on the job and the reading ability of the individuals in that MOS or job. Mikulecky's research (Diehl & Mikulecky, 1980; Mikulecky, 1982) has revealed that the nature of reading at school is different from the nature of on-the-job reading; e.g., the strategies students use in reading may be less effective than those used by employees. Kirsch (e.g., Kirsch & Guthrie, 1984) has reported that the nature of reading on the job varies significantly across type of jobs, such as manager, technician or clerical worker. For example, on average, managers spend more on-the-job time reading society and science material than did the group as a whole; technicians did more reference reading at work than did the group as a whole, and clerical workers read more brief documents than did the group as a whole. It is beyond the scope of this report to describe the current research on workplace literacy in detail, except as it applies to the Job Literacy Project.

II. The Contribution of NAEP Research

A large contribution to the field has been made through the NAEP studies (Kirsch & Jungeblut, 1986) conducted by ETS. The NAEP framework conceptualizes literacy more broadly than ever before. The NAEP model consists of three scales that were designed to represent distinct and important aspects of literacy: prose literacy, which includes prose

materials such as newspaper articles, magazines and books; document literacy, which covers the identification and use of materials found in tables, charts, forms, or indexes; and quantitative literacy, in which arithmetic operations are applied to information in printed form, for example, order forms, menus, or advertisements.

III. The Job Literacy Project

The Job Literacy Project described in this report broke new ground in a number of ways. It was conceptualized with the idea of beginning to apply the NAEP framework in a more focused way, i.e., to the workplace. One goal of the project was to collect and analyze *literacy materials*, i.e., materials that job incumbents read and use to get their work done. A second goal was to develop a new methodology to describe the literacy requirements of a variety of entry-level jobs. The approach is more focused because it centers on the job context rather than on the broader range of skills assessed in NAEP. It is also more focused because it is expected to be used in the design and development of diagnostic literacy assessment and training for individuals with limited literacy skills.

IV. Background and Purpose

The Job Literacy Project was funded by the ETS Office of Corporate Development. It had three major purposes: (1) to test a new methodology called Job Literacy Analysis (JLA), which is a modification of the job analysis procedures used successfully by ETS over the last 15 years to focus on the literacy requirements of the job; (2) to describe the literacy requirements (materials and tasks) of the five entry-level jobs studied, and (3) to collect a broad variety of job-related materials (prose, document and quantitative materials actually used by job incumbents) for use in ETS literacy efforts. The results of the project were expected to be used in the design and development of job-specific or industry-specific testing and training.

The ETS Job Literacy Project was undertaken partly to provide information that other current and past research projects in workplace literacy had not provided. One goal of the project was to ensure that the results could apply across settings, such as business, health care and government. To accomplish this, a cross section of job incumbents in the same job were interviewed, and a sizeable number of job incumbents (25 to 35 per job) were interviewed. The total number of job incumbents interviewed for the project was 190, a favorable comparison with the handful of job incumbents that were interviewed in the other major workplace literacy projects underway in the United States.

In the body of this report, the selection of the jobs to be studied will be described and the basic steps of the methodology will be covered. A general description of the results of the methodology will be included and, finally, conclusions and recommendations will be discussed.

V. Selecting the Jobs to be Studied

The jobs selected for study were entry-level positions that were among the highest-volume, fastest-growing jobs from 1986 to 2000, according to Department of Labor (Bureau of Labor Statistics, 1987) projections. The occupations were representative of three different clusters defined by the Bureau of Labor Statistics. The jobs were also those which were expected to contain examples of prose, document, and quantitative literacy. The final criterion for the jobs to be analyzed in the project was overlap with ETS projects currently underway. The occupations chosen for study were:

Service Cluster:

1. food service worker
2. nurse assistant

Administrative Support Cluster:

3. secretary

4. word processor

Mechanics, Installers, Repairers Cluster:

5. data processing equipment repairer

Data were also gathered on two higher-level jobs: cook (the position into which a food service worker would be promoted) and higher-level or executive secretary. Analysis of these data was expected to occur in future projects.

VI. The Job Literacy Analysis Methodology

The new Job Literacy Analysis methodology tested during this project results in a *job literacy description*, which includes a representative collection of the most important materials required for competent performance of the job, and the relevant (linked) tasks associated with those materials. In the procedure, actual literacy materials used by job incumbents and information about how they are used are gathered during personal interviews. The materials are then analyzed and reduced to a representative set of materials. The resulting draft job literacy description is reviewed by a committee of job experts, including supervisors, and sometimes recruiters and trainers. The job literacy description is revised according to the committee's recommendations and then a survey is developed and distributed nationally to verify the judgments of the group of experts. The survey contains literacy materials, related tasks, and rating scales regarding the use and importance of the materials and tasks. Data analyses performed on the survey responses reveal any difference in importance of a material and its related tasks by gender or work setting. The important literacy materials and related tasks are included in the final job literacy description.

VII. Results

The results of the Job Literacy Analyses conducted will be summarized here.

Food Service Worker

A total of 33 food service workers were interviewed across a variety of settings. Through content analysis and review by an Advisory Committee, the original 20 food service worker materials were reduced to 16, which were included in the job literacy description.

Examples of the materials and tasks included in the description follow:

Material: Sandwich lists

Related Tasks:
1. Count or weigh food portions or read scale
2. Label meat or cheese after slicing and wrapping
3. Mark price code or label on wrapped sandwiches

Material: Recipes

Related Tasks:
1. Read and follow directions to prepare items
2. Modify recipe if needed (to accommodate more or fewer people)
3. Perform taste tests
4. Label meat or cheese after slicing and wrapping

The job literacy description was distributed in survey format to approximately 800 food service managers across the United States. The managers were asked for information regarding the use and importance of the literacy materials and related tasks.

Seventy percent of the managers surveyed returned a completed questionnaire. All materials except one (the Special Diet Tag or Plan) were rated as being used by approximately 50 percent or more of survey respondents. The materials ranged in use from 46.5 percent for

the Hazardous Material Sheet to 96.8 percent for the Food Scale. The Special Diet Tag o· Plan was used by only 18 percent of the respondents overall. However, 90 percent of the respondents in the health care setting used the materials and rated the tasks for which the materials were used as being extremely important. On this basis it was decided that the Special Diet Tag or Plan should be included in the domain of most important literacy materials used by a food service worker on his or her job. Therefore, the survey confirmed the expert opinion of the Advisory Committee regarding the job literacy description.

Nurse Assistant

A total of 29 nurse assistants, from hospitals, nursing homes, and rehabilitation centers, were interviewed and 99 nurse assistant literacy materials were obtained. The materials were reduced to a representative collection of the 30 most important literacy materials and related tasks through analysis and review by an Advisory Committee. The following are examples of the materials and tasks included in the job literacy description:

Material: Hospital Incident Reports

Related Tasks:
1. Read patient's hospital identification card and run through addressograph machine/enter ID information manually on forms
2. Fill out form when patient accident occurs
3. Obtain appropriate staff signatures, personally sign/witness forms

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Material: Intake and Output Record Sheets

Related Tasks:
1. Review/fill out patient's daily information sheet, audio tapes, or assignment sheets from previous shift or for next shift

2. Measure fluid intake and output
3. Read patient's hospital identification card and run through addressograph machine/enter ID information manually on forms
4. Record patient's intake and output
5. Calculate shift and daily totals for each patient on intake and output sheets

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Word Processor

Nineteen word processors in a variety of settings were interviewed for the project and provided 121 literacy materials. The 121 word processor materials were analyzed and the materials and relevant tasks were compared to the secretary materials and tasks. Because of the overlap indicated by the comparison, the word processor materials were dropped from consideration as a separate category for the job literacy description and were combined with the secretary analysis to result in the "secretary/word processor" job literacy description.

Secretary

Sixty-three entry-level and higher-level secretaries were interviewed across settings and 562 literacy materials were collected. The materials were then split into entry-level and higher-level by using the following criteria: current job title, job title of next-higher position, job title of next-lower position, job tasks performed, amount of experience, and specific tasks related to individual interview materials. After this process was completed, 22 of the 63 secretaries were classified as entry-level.

The materials were reduced to a representative collection of the 35 most important literacy materials and related tasks through analysis and review by an Advisory Committee.

These materials and their related tasks comprised the job literacy description. Examples are shown below:

Material: Computer and Other Instructions, Manuals Help Screens

Related Tasks:

1. Format letters, tables, articles, and other materials
2. Layout/create/alter charts, graphs, tables, and other materials
3. Print out hard copy of letter, memo, or document
4. Send mail/distribute to appropriate department/parties, internal or external
5. Read instructions from computer menu/screen (e.g., available options, help screens)
6. Read instructional manuals (e.g., word processing or other software package)
7. Use standard reference materials (e.g., dictionaries, directories, schedules, catalogs, lists)
8. Call up a program and issue commands to retrieve/update data or generate a report (data retrieval programs)
9. Maintain existing files (e.g., file papers in the correct folders, electronically file)

Material: Telephone Messages/Logs

Related Tasks:

1. Send mail/distribute to appropriate department/parties, internal or external

2. Process forms/reports (e.g., fill out/update, attach documentation, distribute)
3. Answer phones: direct, screen calls, write down messages, substitute for switchboard as needed
4. Maintain logs (e.g., mail log, log of phone calls)

Conclusions and Recommendations

The goals of the Job Literacy Project were achieved: first, the project used the same Adult Literacy framework as NAEP (prose, document, and quantitative scales) and began the process of applying the framework to the world of work. Second, a new methodology was developed and successfully tested, as shown by the fact that the Advisory Committees reviewing the materials and tasks presented to them indicated that the materials were relevant and added relatively few materials. Also, when a survey was distributed, the majority of respondents indicated that materials were used on the job and the tasks for which they were used were judged to be important. Third, the literacy requirements (materials and tasks) of the entry-level jobs studied were described. And, finally, a database of about 2,000 literacy materials actually used by job incumbents was collected. The database is the largest of its kind in the country, and it is already being used in the writing of new NAEP items.

The JLA process, as mentioned above, results in a job literacy description, which includes a representative collection of the most important materials required for competent performance of the job, and the relevant (linked) tasks. One additional step is critical to the process if generalizable assessment and training specifications are to be developed from the tasks and materials of the job literacy description. If assessment or training materials were

developed directly from the description, the product would be too specific; no allowance would be made for the transfer of learning which must occur if and when a literacy material were to be modified. However, if the type and level of the skills involved in performing the JLA tasks with the materials can be identified, training is more likely to generalize to the successful learning and completion of similar tasks based on those skills. A cost-effective and practical procedure is needed to examine the literacy materials and tasks and identify the skills involved. The results of the skills definition stage will form the basis for test and/or training design. The skills level of analysis is also an essential next step because it may identify skills that generalize within the relevant job cluster and within relevant career ladders.

Once the skills analysis step has been completed, the new JLA methodology can be put to practical use in the design of different types of assessment and training for a broad variety of clients.

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