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ABSTRACT

This bulletin describes the changing nature of work and summarizes research that has sought to identify the skills that all high school graduates and adult learners should have. It challenges several common assumptions about what preparation is needed for the workplace and how effectively schools are delivering the necessary skills. It cites the fast-paced changes in job skill requirements, notes that unskilled workers will become unemployable by the 21st century, and examines the move toward automation in various service and technical sectors. The need to restructure classroom instruction to compete in the global economy is cited, and results of the Career Preparation Validation Study conducted by New York State Board of Regents are presented. This study sought to verify the skill levels needed to perform various jobs which do not require a 4-year college degree, in order to establish a closer link between work force requirements and education. Bar graphs show the percent of entry-level workers whose jobs require them to perform at various competency levels in language arts, mathematics, and expanded basic skills. Policy questions to consider in shaping the direction of curriculum and assessment reform are discussed, including: (1) Is the school-to-work transition initiative intended for all students or a portion of the student population? (2) Should schools address the total array of skills, knowledge, and behaviors needed in the workplace or just a portion of these skills? (3) Are present curricula disciplines and programs to serve as the foundation for curriculum and assessment reform or will the discussion begin with a clean slate? and (4) How is the need to prepare youth for the world of work balanced with preparing them for other adult roles? The paper discusses changes that will be required in assessment as curricula change to include higher level skills and expanded basic skills. The paper concludes by suggesting that traditional curricula and assessment methods be abandoned and a new educational model be created to prepare students for the 1990s and beyond. (JDD)

LIAISON bulletin ...

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Job Skills of 90's Requires New Educational Model for ALL Students

Education Reform in the 1980s Failed to Prepare Youth for Workplace

The reform movements of the 1980s successfully raised standards in our schools but failed to prepare youth adequately for the requirements of the workplace. To a great extent, we failed because we never identified the specific skills, knowledge, and behaviors demanded of workers today; we simply assumed that providing higher standards in the traditional basics would rectify the problem.

In reality, work today doesn't require simply more or less of our traditional skills, but rather new and different skills (Berryman, 1990). So despite ten years of school reform we now, in 1992, have the greatest gap of any time in our nation's history between the skills young people possess when they leave school and the skills they need for employment.

While schools instituted more of the same in the 1980s, the organization and management of work and the kinds of jobs available in American businesses changed dramatically. The American workplace has evolved from one based, to a great extent, on Frederick W. Taylor's Scientific Management theories (work broken into simple tasks, controlled, systematic, and highly authoritarian) to one based on Edward Deming's theories, where workers are seen as thinking and creative human beings.

Today's elementary and secondary curricula and assessment programs do not reflect the skills, knowledge, and behaviors needed for the changing workplace. Employers are asking workers to do more than ever before. Decision making has filtered down through the ranks, blurring the line between manager and worker. Workers now have to manage their work stations, schedule their time, think about quality, solve problems, and apply their skills to new technologies (Bailey, 1989). What we teach in schools and how we organize and deliver instruction do little to prepare today's graduate to assume these responsibilities.

Introduction

A central topic in American education for the past several years has been the need to raise standards to a level which will enable high school graduates and adults to function effectively in the increasingly sophisticated work world. Unfortunately, seldom is there agreement on the actual level of skill and kinds of knowledge and behaviors graduates need to succeed in today's changing workplace. Without clear definition of the proficiencies graduates should have, we cannot begin to change curricula and assessment programs to ensure their adequate preparation.

In this paper, Willard R. Daggett, Director, International Center for Leadership in Education, Schenectady, NY challenges several common assumptions about what preparation is needed for the workplace and how effectively our schools are delivering the necessary skills.

He also describes the changing nature of work and summarizes research that has sought to identify the skills that all high school graduates and adult learners should have. He concludes by suggesting that (1) we must have the courage to abandon our traditional curricula and assessment methods and (2) we must create a new educational model if we are to prepare our students for the 1990s and beyond.

NASDSE is indebted to Daggett for allowing us to publish this paper as a special edition. Daggett can be reached at 948 Meadow Lane, Schenectady, NY 12309 (518/377-6878).

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One of the primary concerns in the 1980s was the need for basic literacy for high school graduates and adults. We attempted to attain this goal by recreating the schools of our youth — increasing academic requirements and, for students unable to function well academically, creating alternative programs combining literacy and traditional vocational skills. The evidence indicates that we have not succeeded. Instead, the majority of students have ended up in a general track, which gives them neither sufficient academic nor vocational skills.

Today's curricula and assessments still mirror the model of the industrial society of the 1950s; each subject is treated as independent of the others. Furthermore, we continue to see students as passive learners and teachers as disseminators of knowledge, rather than viewing students as workers and teachers as managers of the instructional process.

Job Skill Requirements Change 5 Times Faster than Curricular Change in Schools

Despite 10 years of school reform, high school graduates in 1991 are less prepared for the work force than were graduates of the 1980s. The reason is quite simple: Skill requirements on the job changed at a rate four to five times faster than curriculum and organizational changes in our schools, leaving a gap between what students learn in the classroom and what is expected of them in the workplace (Motorola, n.d.). This gap grows wider with each passing year.

Before we can narrow the gap between the preparation of high school graduates, as well as adult learners, and the requirements of the workplace, we must define precisely the skills demanded of entry-level workers and the level of proficiency required for each skill. To do that, we must understand the changes which have occurred in various employment sectors.

By 21st Century Unskilled Workers will be Unemployable

Let me begin by reviewing some realities of the workplace today. Unskilled labor is no longer an economic commodity in America. In 1950, 60 percent of all jobs in the nation were unskilled. By 1990, this figure had dwindled to 35 percent, and it is projected to drop to 15 percent by the year 2000 (Business Council, 1990). The influx of technology in the workplace and competition from countries where workers receive low wages have contributed to the demise of opportunities for unskilled labor. *By the 21st century, the unskilled person will be structurally unemployable in the United States (Crossroads for America, 1987).*

Today's work world stands in sharp contrast to work at the beginning of the century, when agriculture dominated the economy, employing 85 percent of workers, mainly in unskilled jobs. By 1950, employment in agriculture had slipped to 18 percent of the work force, and today just three percent of workers are involved in agriculture, including farming (Business Council, 1990). Technology and new work procedures have vastly increased agriculture production and changed the types of skills required of workers. Agriculture has little demand for unskilled labor.

The production and manufacturing sector also has changed substantially in America over the last four decades. In 1950, when we had a mass-production system, factory employees worked at specific work stations doing routine tasks over and over again. By the 1980s, it had become apparent that the cost of American labor was too high and the quality of its products inadequate to compete in a global economy (Marshall, 1989).

So we began to introduce advanced automation and robotization. In the process, American production and manufacturing moved to a flexible automated manufacturing system. With the shift from mechanical equipment to electronics/microprocessors came the need for workers to process information symbolically. Instead of being able to manipulate parts of a machine, for example, the worker must now interact with symbols on a computer (Zuboff, 1988). Higher order language arts and thinking skills are often required.

Two central concepts that underpin flexible automated manufacturing are zero-based defects and just-in-time delivery (Berryman, 1988). Today, as products move down an assembly line, tasks once performed by an individual are handled by automated equipment.

The technology depends on precision or perfection — zero-based defects. In other words, all parts being put onto an item moving along the assembly line must have a high degree of precision. On a car moving along the General Motors assembly line, for example, a robotized arm places the steel clamp on the rubber hose. If the steel clamp is even slightly off specification, the arm cannot pick it up. As a result, General Motors has developed new, precise specifications for its steel clamps and all other parts for its cars.

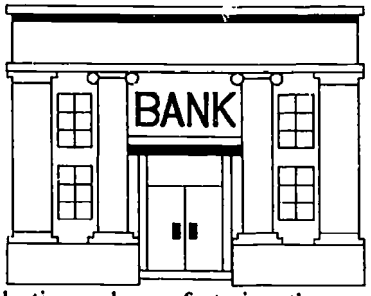
This move by General Motors has caused the company that manufactures the steel clamps to change its production system as well. On short notice, it must produce products with higher levels of precision than in the past. Recognizing that its mechanically-based, manually-run assembly line could not attain the level of precision required by a zero-based defect system, the clamp company had to move to advanced automation and robotization. Its new system requires fewer workers — with different skills than in the past.

Flexible automated manufacturing system does not produce large quantities of identical items to be stored in a warehouse, but simply enough to be sold in one day (just-in-time delivery). Because the company will reset its assembly line many times a day, assembly line workers must now deal with quality control. They must use statistical numerical controls and understand other advanced technological applications involving knowledge of statistics, logic, probability and measurement systems, and applied physics. Because they need to communicate with customers on a regular basis and constantly reset the assembly line, workers must be familiar with wide area network systems and do a great deal of technical reading and writing.

Ironically, at the same time that this transformation in manufacturing and production was occurring, many American schools were adding more traditional math, science, and language arts to student course loads. Neither the 1950 graduate nor most 1991 graduates received much instruction in statistics, logic, probability, measurement systems, technical writing, technical reading, applied physics, or information systems as part of the curricula.

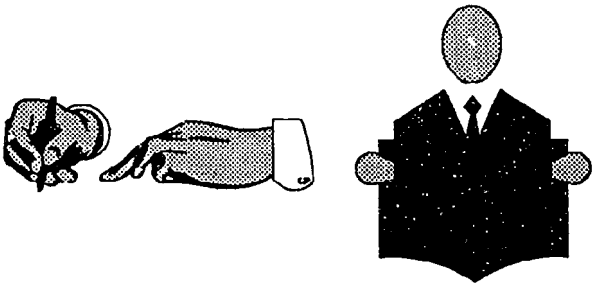
The 1991 graduate is practically identical to the 1950 graduate in terms of skill levels and knowledge, and both are structurally unemployable in the production and manufacturing sector of the 1990s.

Service and Technical Sectors are Moving toward Automation: Banks, Mechanics, Fast Foods



Like production and manufacturing, the service sector is starting to move toward automation. Automatic teller machines (ATMs), for example, have had a profound impact on the banking industry. In the last five years, ATMs have replaced 40 percent of the cashiers and tellers across the nation, and may replace an additional 40 percent in the next five (U.S. Department of Labor, n.d.).

The fastest growing group of jobs in the banking industry involves setting up, operating, and maintaining ATMs and related information systems. Most banks cannot easily retrain their cashiers and tellers to work with the ATMs or the information systems of the bank because the math, science, and language arts skills are different from the traditional requirements for cashier and teller positions. As a consequence, banks have begun to contract these jobs out to companies based overseas and to lay off cashiers and tellers at home.



The job of technician has undergone similar changes. Let's look at auto technicians as an example. In the early 1980s, when most cars were still mechanically-based, auto mechanics used their senses to diagnose a car's problem — listening, touching, watching — and relied on their mechanical aptitude to fix the car. Most present-day cars are computer-based, however, with microprocessors and electronic circuit configurations that are impossible to troubleshoot by sight or sound. The auto technician must use diagnostic equipment and computerized technical manuals. If the problem is other than routine, the technician must write a technical statement to describe what is wrong with the car.

This technical statement is necessary because automotive manufacturers are constantly analyzing the various electronic and microprocessor configurations in cars to determine whether any changes need to be made. Every time a change is made — often daily — the manual used by auto technicians must be modified accordingly. For this reason, the manual is computerized and placed on a wide area network system to be updated daily. When a technical statement regarding a problem is written and entered into the system, the system searches the database and prints out technical instructions on how to fix the car.

Our high schools do not teach the technical writing and reading skills needed to be an automotive technician today. To compensate for the lack of new workers with relevant skills, automobile dealers are putting adult workers through extensive retraining or hiring young people educated in other countries who have appropriate skills.

Even in fast-food restaurants, advanced technologies are beginning to replace many unskilled workers. Push-button service is the latest innovation in the industry. A customer puts money in a machine, much like a soda machine, pushes a button to order a hamburger, pushes a second button to select what should be on it, and a third to indicate how it should be cooked. In 13 seconds, the hamburger is prepared — fresh from

a laser, high-speed cooker interlocked with an information system. This equipment could eliminate most counter and grill jobs, but although the necessary technology is readily available, American business cannot implement it because our workers cannot support its use.

We have not even identified the basic math, science, and language arts skills needed to understand this technology, namely, statistics, logic, probability, measurement systems, applied physics, technical reading, technical writing, and information systems (Noyelle, 1988).

Another major transformation has been taking place in the information industry, the current growth sector of the American economy. By the close of this decade, it is predicted that 44 percent of workers will be in the business of collecting, analyzing, synthesizing, storing, and retrieving data (Business Council, 1990).

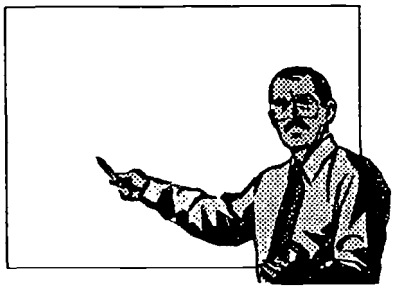
New technology will continue to change the information sector in the 1990s. Voiceprint, which translates the spoken word to hard print instantaneously, will be in regular use. Spell-check systems are increasing from 50,000 to 500,000 words. Grammar and punctuation checking systems and language translation systems will be common.

By the end of the 1990s, we will be able to speak into a machine and in an instant have hard copy with any spelling, grammar, and punctuation errors corrected. A voice driven typewriter is already available in America (USA Today, 1990).

Consider the impact of PCs with networking capability and fax machines on businesses in the past decade. Neither had been produced yet in 1980. Imagine the effect that voiceprint, grammar and punctuation check, and language translation will have on the 1990s. It will virtually eliminate unskilled labor in the information processing sector and make obsolete or greatly change such jobs as clerk typist, file clerk, and word processing operator.

We Must Restructure How We Deliver Classroom Instruction

To compete in the global economy of the 21st century, we must not only raise education standards but also teach a more appropriate curriculum and restructure how we deliver instruction. Several research projects addressing this issue have been conducted by various groups across the nation:



- *Workforce 2000: Work and Workers for the 21st Century, The Hudson Institute*
- *Defining Skills Needed for the Workplace: Preliminary Findings, Fort Worth Independent School District and Fort Worth Chamber of Commerce*
- *The Secretary's Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor*
- *Workplace Basics: The Skills Employers Want, The American Society for Training and Development*
- *Michigan Employability Skills Technical Report, Michigan State University*
- *Building Public-Private Partnerships to Improve Vocational Education in Illinois, Northern Illinois University*

The most comprehensive research on the specific skills workers need was recently completed in New York State. An overview of this study is presented here because it illustrates the kind of information we must have to close the gap between workplace requirements and school preparation.

New York's Career Preparation Validation Study — Closing the Gap between Work and School Preparation

The Career Preparation Validation Study resulted from a process begun in April 1989, when the New York State Board of Regents issued a policy statement that "All recipients of a local or Regents diploma should be prepared for immediate employment and/or postsecondary education." To implement the policy, a Statewide Steering Committee was appointed in 1989 and submitted its final report to the Board of Regents in January 1990.

The Steering Committee recommended that performance levels for all students in language arts and mathematics (called Basics) be raised. The Committee also identified a group of skills (called "Expanded Basics") that they believed were not addressed adequately in the curriculum and recommended that those areas — interpersonal skills, thinking skills, human relations, information systems, and personal skills — be incorporated in all educational experiences.

A nationwide search revealed that no precise data existed on the specific levels of competencies in these skill areas students should attain in high school in order to succeed in the workplace after graduation. Thus, the Committee recommended that a validation study be conducted to identify the skill levels graduates need to obtain and maintain employment. The Career Preparation Validation Study which was carried out sought to verify the skill levels needed to perform various

jobs which do not require a four-year college degree. This knowledge would then be used to establish a closer link between work force requirements and education.

Based on the advice of a national panel of experts, the State Education Department developed scales describing a continuum of competence from simple (level 1) to complex (level 6) for the Basic and Expanded Basic skill areas. These scales reflect adult standards of performance from the lowest observable demonstration of an outcome to outstanding performance of that outcome. The scales resemble Bloom's Taxonomy, where 1 is awareness, 2 — comprehension, 3 — application, 4 —analysis, 5 — synthesis, and 6 — evaluation.

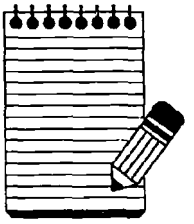
State Education Department staff collaborated with representatives of various education and business organizations, including The Business Council of New York State, New York State AFL-CIO, New York State United Teachers, the New York State Council of School Superintendents, the State Job Training Partnership Council, the New York State School Boards Association, and the New York State Department of Labor, to ensure support for the study.

The New York State Department of Labor worked closely with the State Education Department to produce a listing of job clusters representative of the labor market in the state. Jobs were then selected which require less than a baccalaureate degree. For purposes of the study, these jobs are referred to as entry level even though some may require education or training after high school.

Based on research methodology, the decision was made to observe and interview successful workers to gain the desired data rather than to rely on job descriptions, job requirements, and/or employer perceptions. In the observations/interviews, each worker's major tasks were identified and analyzed, then matched to the kind and level of skill needed to complete the tasks.

Approximately 1,400 observations/interviews took place during 1990, with slightly more than half occurring in firms which employ fewer than 100 people. The Department of Labor then summarized the findings on the completed survey forms with assistance from the State Education Department.

Summary of Study Results



Language Arts. Language Arts comprises three skill areas: reading, writing, and listening/speaking. Validation study results for Language Arts support recommendations for higher levels of competence in this core area to better prepare students for immediate employment after high school.

The study suggests the need for considerable emphasis on Reading for Information and the Reading for Critical Analysis and Evaluation as requisite for entry-level employment. Although Reading for Personal Response is a valuable adult skill, it is considered unimportant in the work world.

Findings indicate that Writing for Personal Expression and Writing for Social Interaction are seldom used on the job, while Writing for Information and to a lesser extent Writing for Critical Analysis are important job components.

The bar graphs on pages 6-11 show the percent of entry-level workers whose jobs require them to perform at the various competency levels on the scales for Language Arts, Mathematics, and Expanded Basics.

The study indicates that approximately one half of entry-level workers require skill level above level three in Listening/Speaking for Information and Understanding and Listening/Speaking for Critical Analysis and Evaluation.

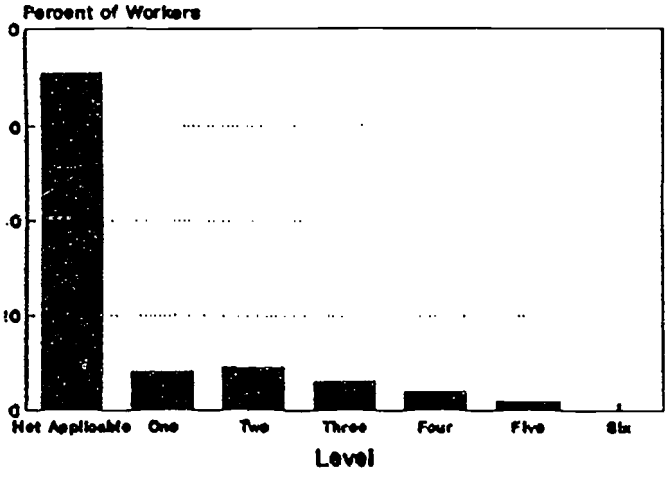
Mathematics. Math skills involving Basic Operations, Logic, Probability, and Measurement were shown to be the most essential math competencies for entry-level workers. The level of skill needed in these areas, with the exception of Basic Operations, exceeds current assessment requirements. Algebra and Geometry appear to be of minimal significance as job skills for entry-level workers.

Expanded Basics. The study results underscore the almost universal importance of a high level of competence in the Expanded Basics for entry-level workers. The level of competence expected of entry-level workers in many of the Expanded Basics appears to be substantially above the level provided through school curriculum.

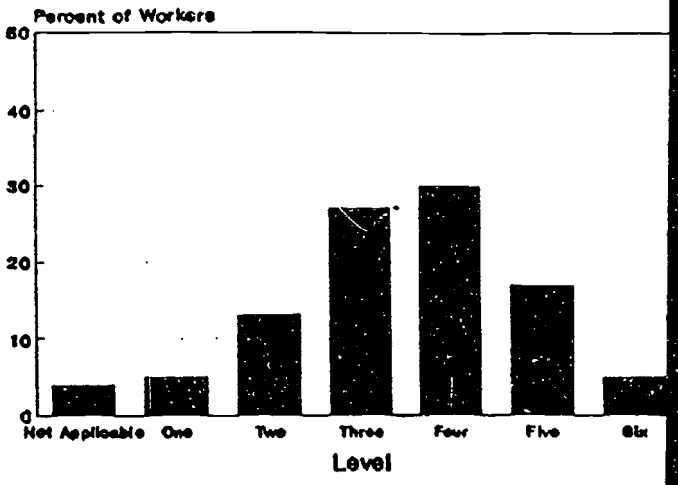
Matching Curricula to Workplace Skills

To begin the process of creating a closer match between what we teach in school and requirements for employment today, states should analyze the research studies noted in this

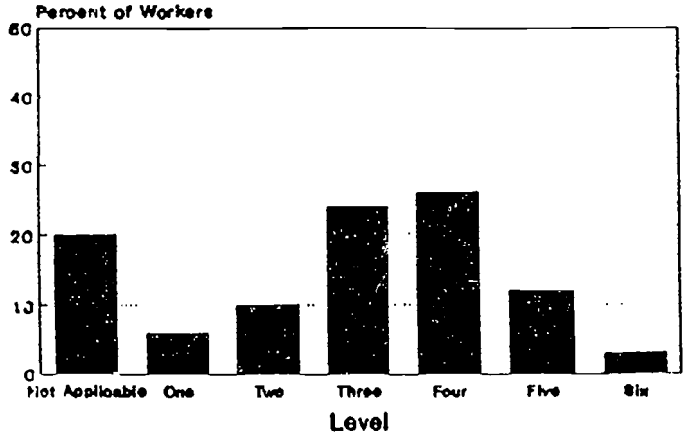
Reading for Personal Response



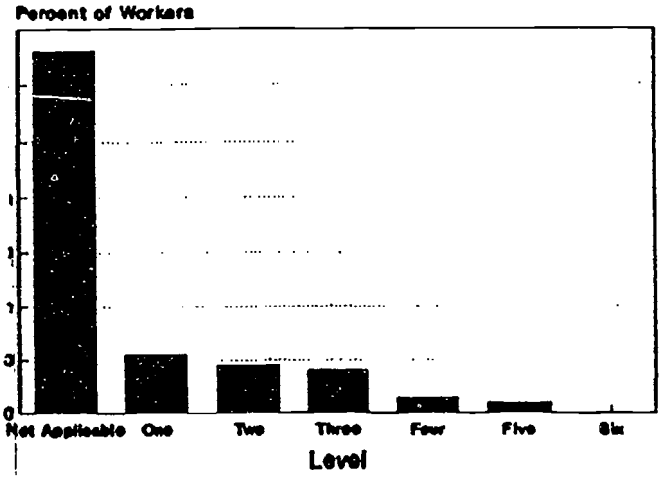
Reading for Information



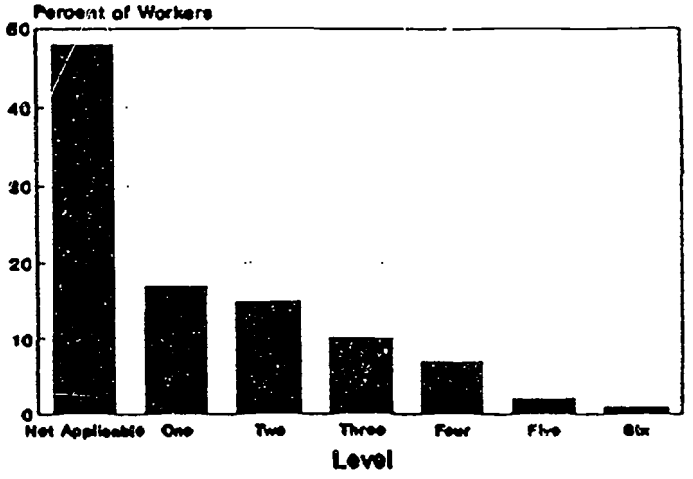
Reading for Critical Analysis and Evaluation



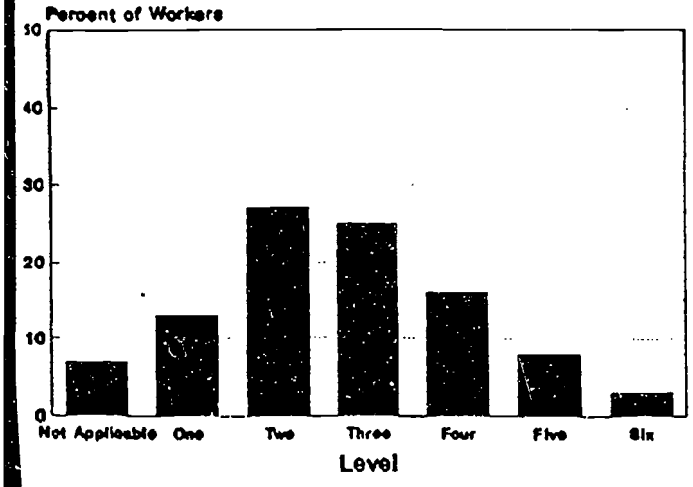
Writing for Personal Expression



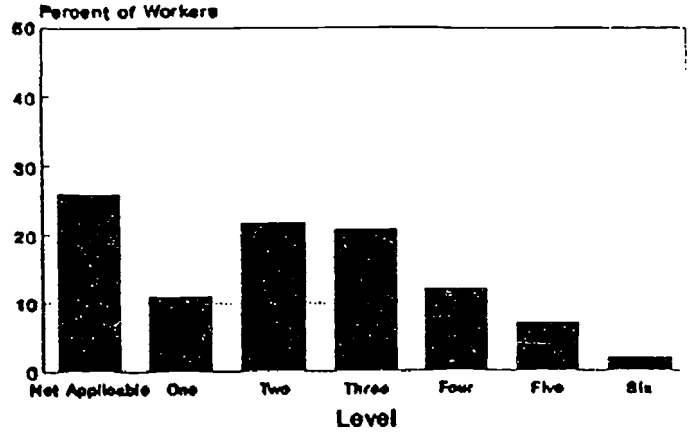
Writing for Social Interaction



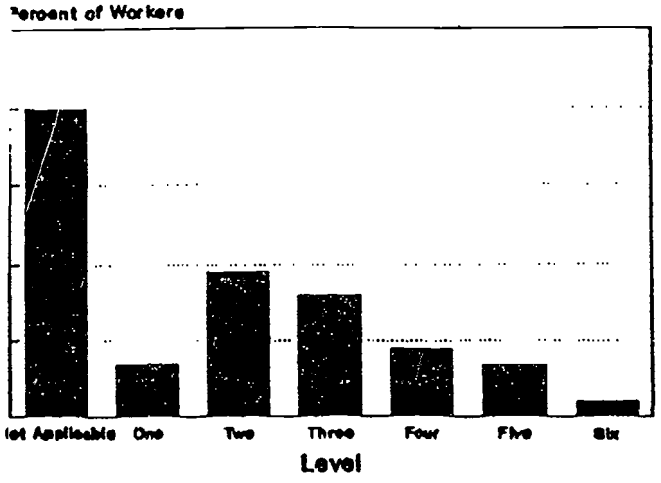
Writing for Information



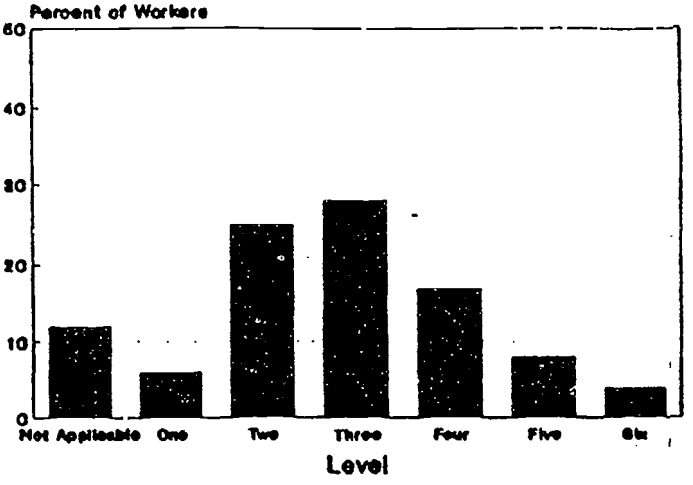
Writing for Critical Analysis and Evaluation



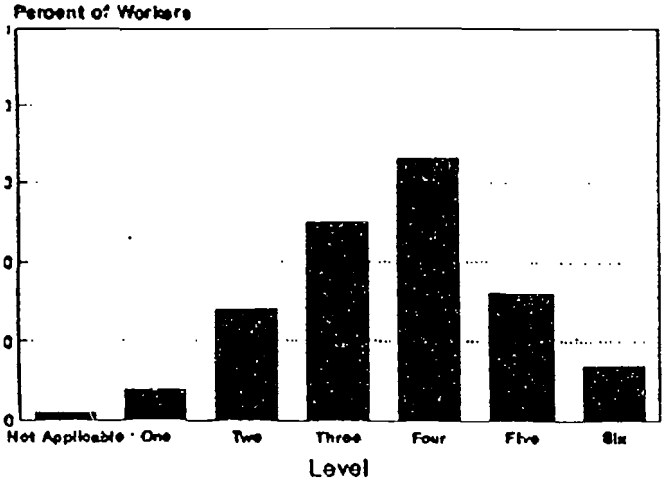
istening/Speaking - Personal Response



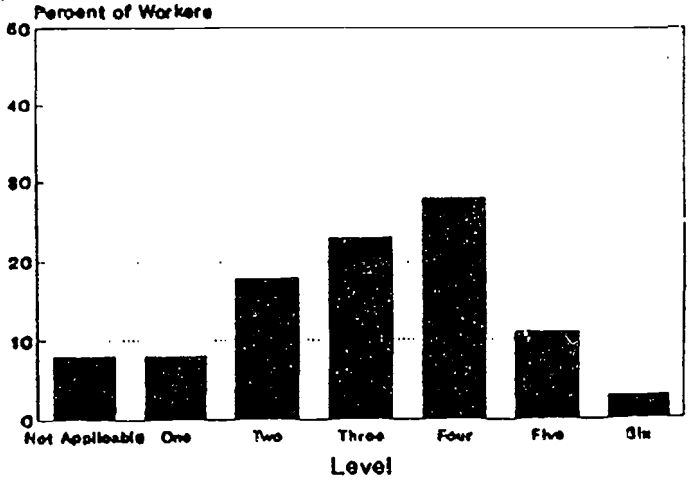
Listening/Speaking - Social Interaction



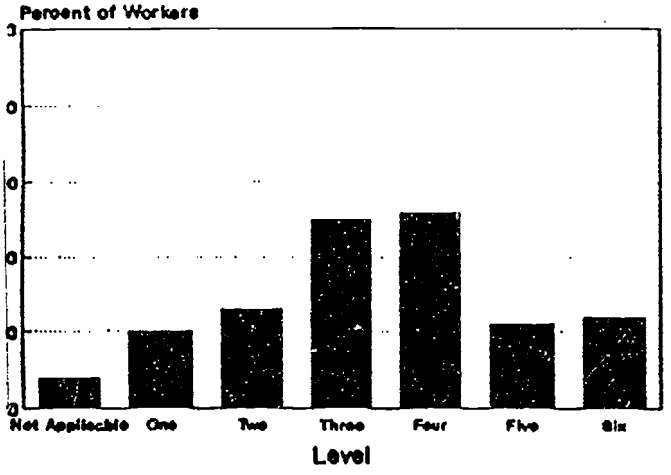
Listening/Speaking - Information



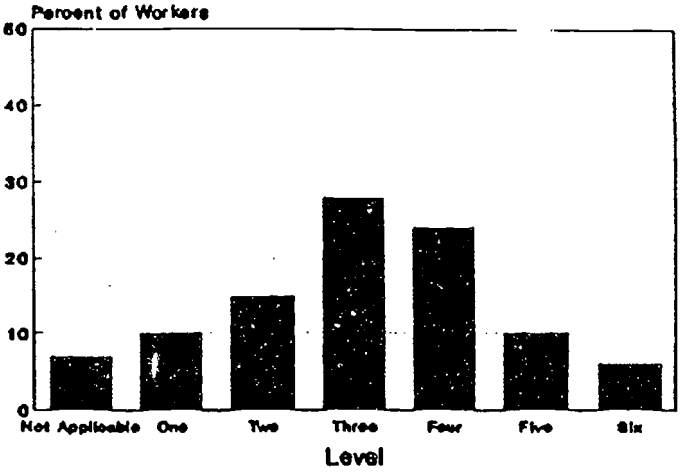
Listening/Speaking - Critical Analysis



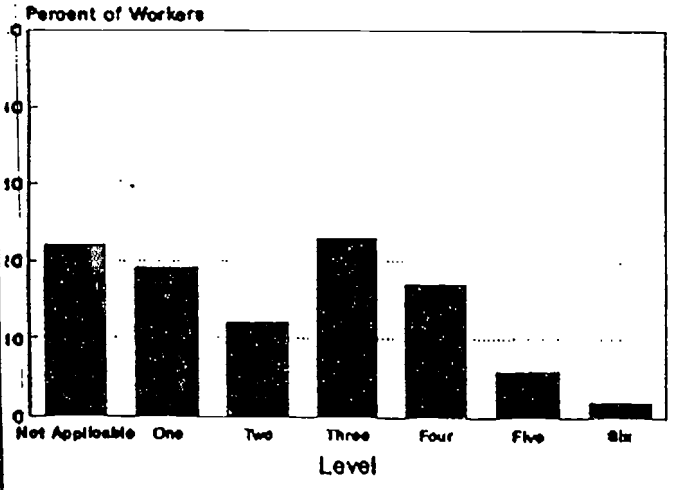
Math - Basic Operations



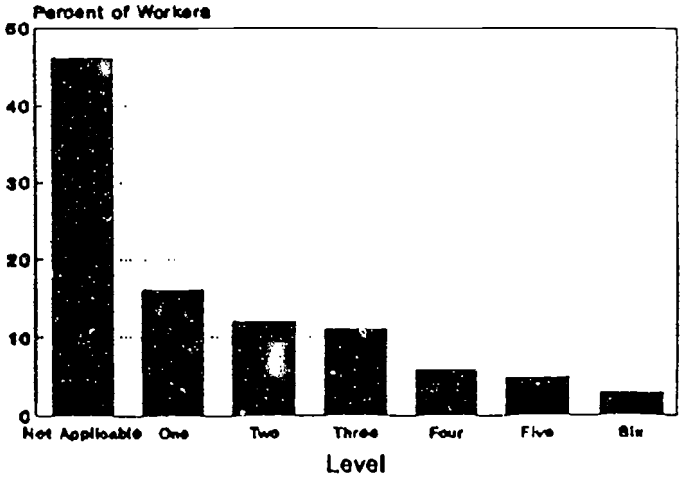
Math - Logic



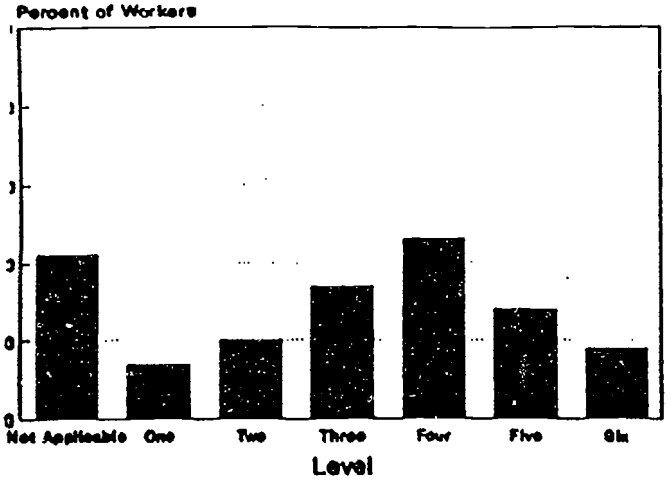
Math - Probability



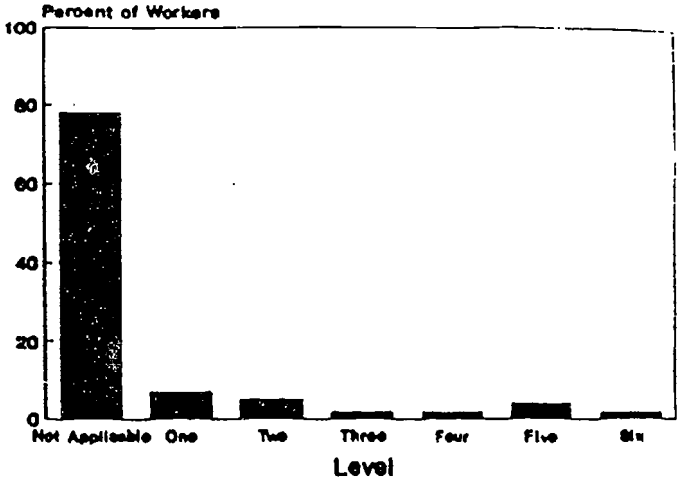
Math - Statistics



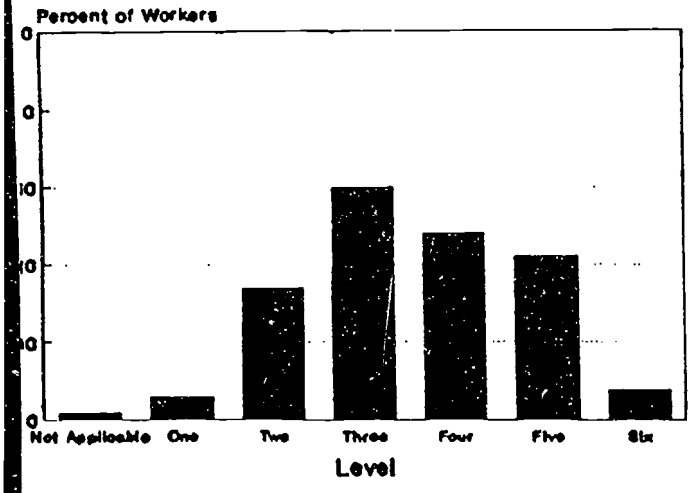
Math - Measurement



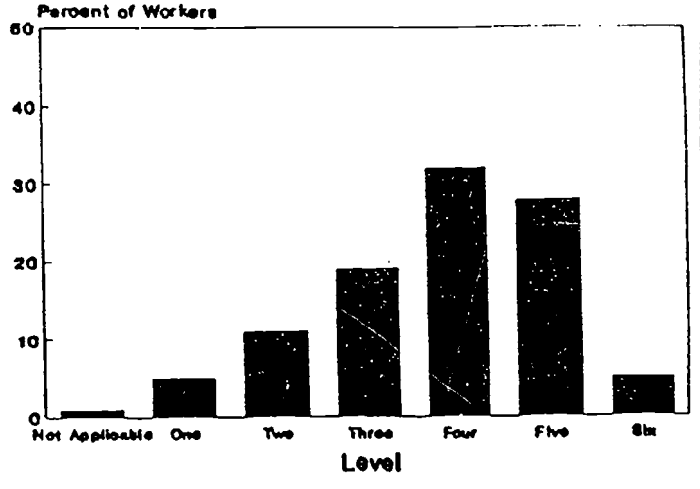
Math - Algebra/Geometry



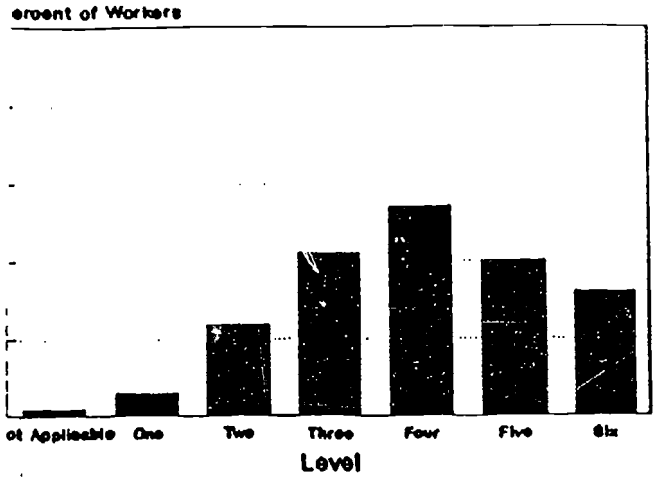
Manual Dexterity



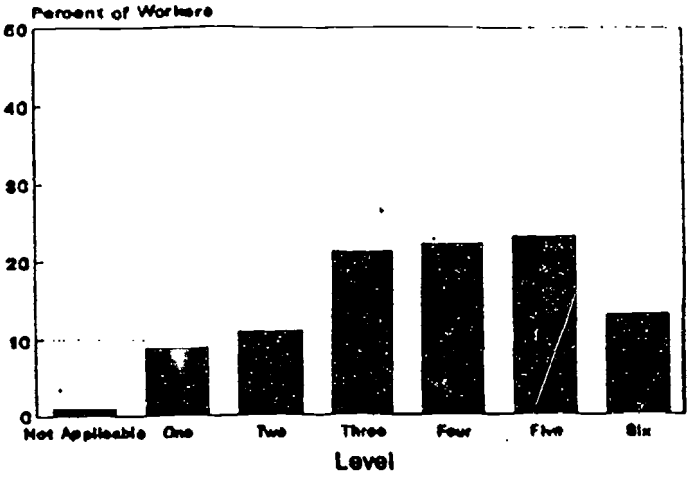
Reasoning



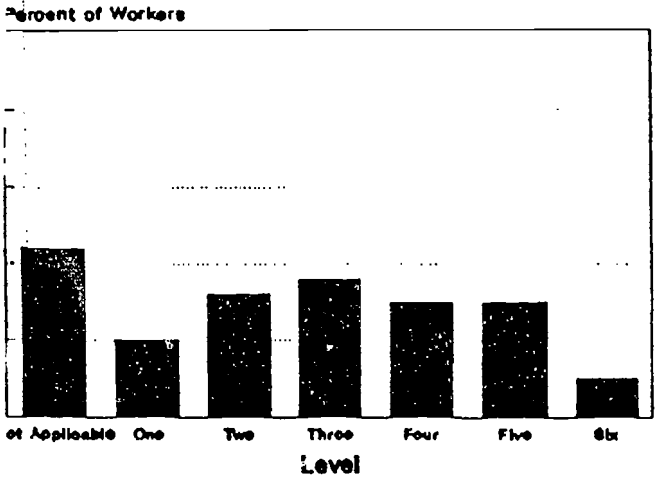
Interpersonal Skills



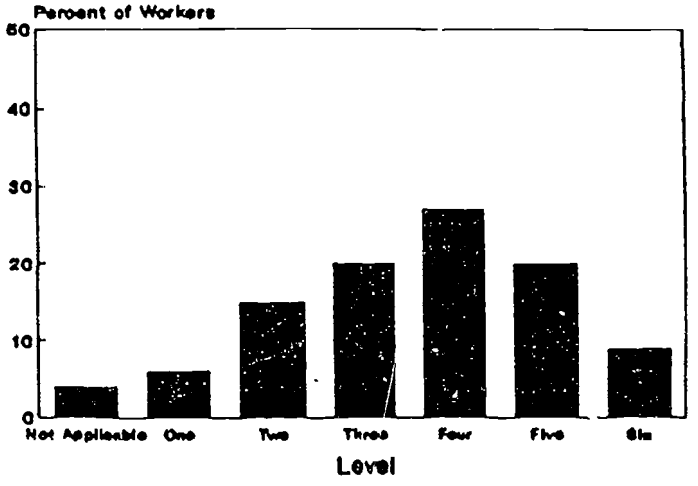
Working as a Member of Team



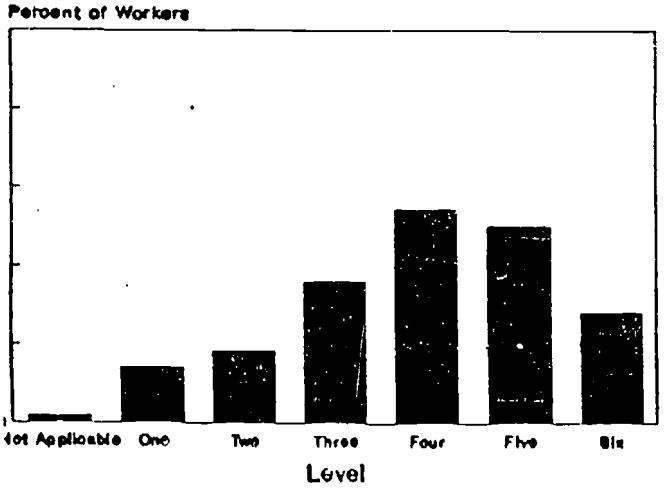
Using Information Systems



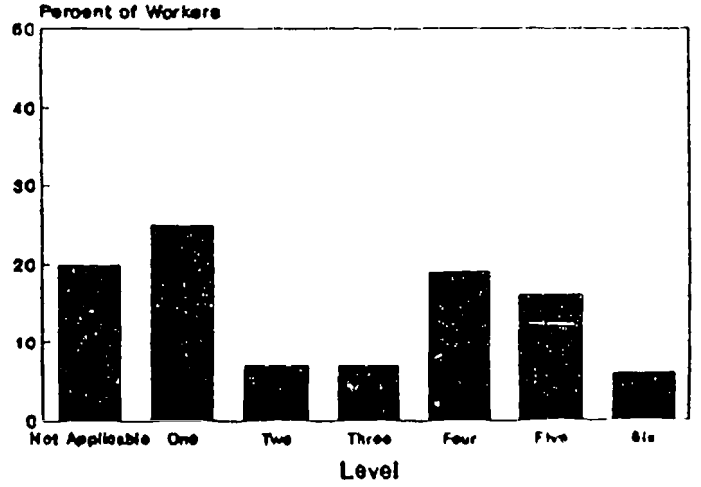
Setting Priorities



Personal Work Skills and Behaviors

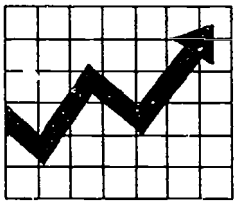


Personal and Civic Responsibility



today, states should analyze the research studies noted in this paper to ascertain the skills, knowledge, and behaviors needed to function in the workplace. Consultations with business and industry can validate the findings of this research. *Particular emphasis needs to be placed on strong and relevant reading, writing, speaking, listening, mathematics, and expanded basic skills, taught at the application level or higher.*

States and school districts then must assess how well present curricula deliver the needed skills, knowledge, and behaviors. Most likely, the comparison will indicate a mismatch between what we teach in the identified areas and the actual skills used in the world of work, as well as a failure to incorporate instruction in many expanded basic skill areas. Such skills as technical reading, technical writing, applied physics, statistics, logic, probability, and knowledge of measurement and information systems are basic to job performance today.



It is crucial now, as we talk of school restructuring, that we identify the actual skills and the levels of proficiencies students need to function as skilled employees. Research shows that when we use a skill, it is at least at the application level. Simple knowledge or understanding, the level we typically teach to and test at in school, is not adequate for the workplace today. Job-specific skills may need to be added to the basics in math, science, and language arts, but we must begin by making sure that those core curriculum areas are relevant to the work world and that they incorporate the expanded basic skills, like problem solving, knowledge of information systems, and working as a member of a team.

How Policy Questions are Answered will Shape Curriculum and Assessment Reform

Before we discuss how to modify curriculum and assessment programs to strengthen the tie between school and work, we must address certain policy questions. How these questions are answered will shape the direction of curriculum and assessment reform.

(1) Is the school-to-work transition initiative intended for all students or a portion of the student population?

(2) Should schools address the total array of skills, knowledge, and behaviors needed in the workplace or just a portion of these skills?

(3) Are present curricula, disciplines, and programs to serve as the foundation for curriculum and assessment reform or will the discussion begin with a clean slate, with no program or discipline assurances?

(4) How do we balance the need to prepare youth for the world of work with preparing them for other adult roles?

Policy Question 1: Is the school-to-work transition initiative intended for all students or a portion of the student population?

Nearly all young people will eventually go to work — some after dropping out of high school, some after graduating from high school, and others after some postsecondary education. Less than one quarter of our students will complete a postsecondary educational experience before entering the work force. In all cases, students should be taught, sometime in the school experience, the appropriate math, science, language arts, expanded basics, and other skills for the workplace.

If we decide that school-to-work transition programs, and the skills provided through those programs, are for non-college-bound and general track students only, we must recognize that we are establishing a tracking system and short-changing our college-bound students, who will eventually enter the work world without having acquired the basic skills needed to succeed. Although apprenticeship and related programs of Europe and Asia have attracted much interest, those programs create a pronounced tracking of students early in their secondary school careers.

Schools are an extension of society, and while tracking is consistent with European and Asian values, attitudes, and beliefs toward work and education, it conflicts with American values. Our nation is committed to providing all students an opportunity to attend higher education. For that reason, separating preparation for postsecondary education and preparation for employment may be counterproductive.

However, many people feel that American schools already have three tracks: a college preparatory track for the most academically talented students; a vocational track for those whose learning style and, in some cases, career aspirations, relate to a more applied curriculum; and the general track, which does not prepare students adequately for postsecondary education or employment.

If we determine that separate programs are indeed necessary we should not let our fear of tracking lead to paralysis of our system, as the William T. Grant Foundation Commission

on Work, Family, and Citizenship noted in the "The Forgotten Half" (1988). *We must in any case eliminate the growing general track, which has little or no academic or vocational relevance.*

Answer: School to work transition should be central theme for all students

School-to-work transition should be a central theme of every student's educational program. More than three quarters of our students fall off the education ladder — by dropping out of secondary school, by dropping out of college, or by graduating from high school in a general track, with no plans to continue their education. minimal academic skills, and no work skills. Those students who complete higher education also go to work.

Policy makers throughout the nation must make a commitment to emphasizing the school-to-work transition in elementary and secondary curricula so that we teach every student the math, science, language arts, and other skills relevant to the world of work.

Such a policy will require a concerted effort to enlighten the many educators who believe that preparation for work has nothing to do with school. Large-scale staff development will be an ongoing need for faculty. Awareness programs for parents and the general community should be conducted to explain the changes occurring in the workplace and the important role of schools in preparing the workers of tomorrow.

Policy Question 2: Should schools address the total array of skills knowledge and behaviors needed in the workplace or just a portion of these skills?

The New York State Validation Study, as well as the studies listed on page 3, make it clear that a group of skills not directly attributable to a specific discipline is extremely important in today's workplace.

These skills, identified earlier as expanded basics, are central to the ability of any student to obtain and maintain employment, yet they are typically neglected in most schools. Although teachers may say these skills are covered in the curricula, most curriculum documents show no evidence of precise instruction in these skills. In reality, we typically do not teach the expanded basic skills or, if we do, they are covered in a superficial way.

Moreover, in many cases our delivery methods are counterproductive to the development of these skills. Too many of our classrooms are based on teacher-talk, that is, the student listen-and-read scenario. We must place far greater emphasis on fostering a learning environment where students function as active workers and teachers as managers of the instructional process (Shanker, 1988).

As noted by Lauren Resnick, schools now teach students to work *independently,* while in the work world they now need to work *interdependently* with others. Generalized work in school does not prepare students for situation-specific competencies needed on the job. If schools are to respond to the nation's economic needs, they must teach the skills, knowledge, and behaviors which employers have identified as crucial to workplace success.

Answer: *Yes!*

School districts throughout America should deliver the total package of skills, knowledge, and behaviors needed for the workplace. Incorporating previously untaught skills will require major modification in how we organize and deliver instruction, as well as in the content of our courses and programs. Furthermore, new assessment techniques, such as the portfolios and authentic assessment, will be needed to measure many of the expanded basics skills.

Policy Question 3: Are present curricula disciplines and programs to serve as the foundation for curriculum and assessment reform or will the discussion begin with a clean slate, with no program or discipline assurances?

The present organization of curriculum in our schools grew out of an industrial model where tasks (and therefore courses in school) were seen as mutually exclusive and independent of each other.

For political, financial, and institutional reasons, the school reform movement of the 1980s began with the belief that existing curricula, disciplines, and programs should serve as a foundation for future programs. We tinkered with programs and courses instead of contemplating a wholesale restructuring of school curriculum. The issues that caused us to maintain the existing disciplines as a point of departure in the 1980s are still central considerations in the 1990s. Balanced against the political realities and the need to maintain institutional stability, especially in the wake of fiscal problems in our schools, the following factors must be considered.

- *There is a clear need for all students to have stronger applied academic skills in math, science, and language arts if they are to function in the workplace. To address this issue, schools should look at ways to bring together academic and vocational education programs at the secondary level. At the same time, there is enormous political pressure to tie school-to-work transition programs to the various adult and postsecondary vocational-related and literacy-related programs. These programs deal with short-term, job-specific training rather than the development of broader skills. The decision is whether to tie school-to-work transition program to the broad-based academic skills students need, to the job-specific skills provided in the adult sector, or to a combination of these.*

- *Our existing elementary/secondary curricula were established at a time when there was little commitment to school-to-work transition. Therefore, they may be fundamentally flawed for purposes of incorporating instruction for this transition. We are the only industrialized nation in the world that did not base its secondary school programs on a belief that all students should be prepared for some type of school-to-work transition. We simply left that job to the vocational education programs, which were designed for a select few in America. Consequently, our vocational education curricula, with their focus on job-specific skills, and our academic curricula, with their focus on developing skills at the understanding level rather than the application level, are both inappropriate in a school-to-work transition program. Simply merging these two programs would give us a third inappropriate applied academic program.*

- *In any school-to-work transition program, instruction must bring students to the application, analysis, and synthesis levels, not simply the understanding level. Furthermore, students must be actively involved in the learning process as workers, rather than passive learners, if they are to achieve these higher levels of skill (Shanker, 1988). Technologies that allow students to be more engaged in the learning process may be one way to promote active learning.*

Answer: We must reconfigure present discipline to focus on higher levels of application

Although it would benefit our students and country to abandon the traditional courses, curricula, and assessment programs in place in our schools, moving this far is politically and economically unrealistic. Instead, we must rethink and reconfigure present disciplines into interdisciplinary packages which focus on learning at the higher levels of application, analysis, and synthesis for skills workers actually use in their adult lives.

The expanded basic skills must be included in these packages. Extensive staff involvement in planning and executing these changes will be the critical factor. Teachers must understand that their present courses and assessments are simply means to an end, not ends in themselves. *States and localities should develop a continuum of school-to-work transition programs, beginning with integration of academics and relevant applications to work in elementary and secondary schools and moving toward more specialized training which builds upon these applied academic skills.* Incentives should be developed to reward schools and programs that move toward an integrated program designed around a continuum.

Policy Question 4: How do we balance the need to prepare youth for the world of work with preparing them for other adult roles?

Schools must continue to balance the various demands placed upon their instructional programs. Worker is one of several adult roles. Lifelong learner, citizen, family member, consumer, effective user of leisure time, and being of good moral/ethical character are all essential roles or attributes which should be addressed in our school curricula. We must identify the knowledge, skills, and behaviors needed for each of these adult roles. Movement towards a more outcome-based education program should enable us to do that.

In my work with educators in school districts across the country, we have found that the language arts, mathematics, science, and expanded basic skills needed are nearly the same for all adult roles. Through a series of community work sessions, community leaders, parents, teachers, and business leaders have been asked to rate and rank the importance of language arts, mathematics, and expanded basic skills to various adult roles, using Bloom's taxonomy as the scale.

The results are the same in community after community. The skill levels needed for work are comparable to the skill levels needed for all adult roles with the exception of use of leisure time. With leisure time, the skill level is typically at level 2 (understanding) and the skills most often used are compatible with the existing school curricula.

For all other adult roles, a major mismatch exists between the skills and levels of competencies needed (at the application level or higher) and those taught in our schools.

Answer: Outcome-Based Education Movement can be springboard for development of new curricula

We should identify the total array of skills, knowledge, and behaviors needed for all adult roles and then compare the levels of skills required for each role. In the process, the need to refocus our math, science, and language arts curricula will become apparent. The work of the outcome-based education groups across the nation can serve as a springboard for developing new curricula.

With the previous four policy questions answered, curriculum issues become relatively easy to resolve. All curricula should be organized on a continuum based upon the skills,

knowledge, and behaviors students will need in their adult years.

The following actions should be taken in every state to establish a curriculum that promotes a school-to-work system.

- *Develop an awareness program to create understanding of the need for change in what is taught in our schools. Then, have faculty use the research delineated in this paper to validate the specific skills, knowledge, and behaviors needed for work in individual communities and/or states.*
- *Make a commitment to ongoing research on the identification of skills, knowledge, and behaviors needed for adult roles. Our multi-billion dollar industry needs this basic research to ensure we are teaching the right skills in our schools.*
- *Reorganize all curricula on a continuum from simple to complex using some type of taxonomy, such as Bloom's.*
- *Reorganize the delivery of instruction so that students become active participants in the learning process rather than passive learners, and change the role of teacher from disseminator of information to manager of the instructional process.*
- *Move towards the integration of relevant academic and vocational skills into an applied academics curriculum, taking care not to simply combine the old inappropriate vocational programs with the old inappropriate academic programs.*
- *Use the applied academics program for all students, not just for those who may not move on to higher education. All students should be taught how to apply knowledge so that they can be successful in the work world, whether as an entry level worker, a mid-level technician, or a manager/professional. The applied academic curriculum is recommended rather than the two-track models of Germany or Asia, which, in America, could result in premature and irreversible tracking. Curriculum models such as Principles of Technology, Applied Communications, Computer Information Systems, Business Information Systems, and Introduction to Engineering, described in Appendix C, should be considered instead.*
- *Broaden the methods used in teaching. Students have different learning styles. American schools have catered to the passive learning style which is dominated by memorizing textbooks and teacher-talk. Students who learn best in active, hands-on environments are neglected in our schools. Instruction needs to be substantially changed to recognize and even reward the latter learning style, which is more compatible with how learning occurs in the work world. We must pay heed to John Goodlad's warning in A Place Called School that teachers in lectured-based classrooms are a turn-off to nearly all students.*
- *Provide opportunities for students to combine work experience and education as a means of career planning and decision making. Options could include cooperative work experience program for all students as well as structured summer work experience combined with remediation and enrichment for students experiencing difficulty in school. Schools could establish a simulated process or organization to produce goods and services, thus helping students to develop a good work ethic and a clearer understanding of business.*
- *Make a major commitment to ongoing staff development. The new curricula and delivery methods being promoted are fundamentally different from those which teachers are using now. Before major curriculum changes can be made, substantial staff development is essential. European and Asian educators receive far more inservice training than American educators, and American businesses have learned that they cannot begin to change methods and introduce new equipment without substantial staff training. American educators must understand what most of the world has already learned—without staff development, there is little progress towards excellence in education.*

Staff development must begin with an awareness program for teachers and administrators on the changing nature of work and why so many of our young people are functionally unemployable.

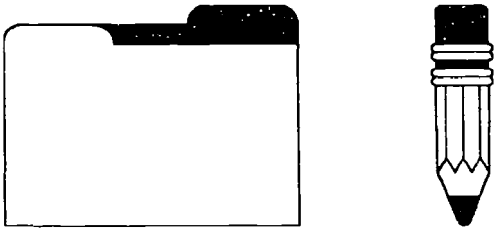
As noted earlier, many teachers do not believe that being prepared for work has anything to do with the school curriculum. They may also believe that only minimal skills are needed to function in the workplace. Unless we change the general attitude towards the purpose of education, these teachers will continue to do what they have always done when they close their classroom doors — teach a curriculum that has little relevance to the world of work.

Without an understanding of the need to change what we teach in response to the demands of today's workplace, we will fail in any type of school-to-work transition program.

- *Change student information or report card systems to make them more meaningful. Present systems, which give letter or numerical grades for independent courses,*

tell employers, parents, and others little, if anything, about the true progress students are making. Student information or report card systems should be modified to reflect what students actually know and can do in the skill, knowledge, and behavior areas selected. Student progress would be plotted in terms of moving from rudimentary knowledge to mastery of complex skills.

Curricula Should Drive Assessment



Major changes in state and local testing programs cannot be made until curricula have been modified. Curricula should drive assessment, not the other way around. It is apparent, however, that when we begin to teach higher level skills and the expanded basic skills, we will need to change our testing programs and move toward portfolios and authentic assessment techniques (Wiggins, 1989).

Vermont — The greatest progress that has been made to date in assessment may be found in the Vermont portfolio system. The Vermont system assesses the achievement of 4th and 8th grade students in writing and mathematics using three methods: a uniform test, a portfolio, and a best piece. The uniform test uses equivalent tasks administered under the same conditions. The portfolio contains the student's significant class work from the course of the year.

Because the work in the portfolio is the result of regular classroom work, teachers will already have assessed each piece individually. Teachers and students review portfolio work using criteria developed by Vermont educators and suggested in writing and mathematics handbooks. The third component of the assessment consists of a best piece — students select from their portfolios those works that represent their best efforts of the year.

The Vermont Department of Education offers inservice programs for Vermont teachers in reviewing student work. The purpose of the program is not to rank students or teachers, but to learn how well Vermont students write and how well they understand mathematics. Vermont has completed the pilot of its new assessment system and began to implement the system statewide in 1991-92.

Michigan — The Michigan Department of Education initiated an Employability Skills Portfolio Program in the fall of 1990 in 13 intermediate and 23 local school districts, based upon a series of employability skills identified as necessary to obtain and maintain employment in the 1990s. These skills were grouped into three categories: academic, personal management, and teamwork skills.

The Michigan system involves a process where students must discover, document, and develop their employability skills. It is a personalized system of external assessment and self-assessment. The portfolio requires students to integrate various skills and then to record their experience. The portfolio has no limits. It does not focus on minimal skills nor does it limit the highest skills an individual student can achieve.

In January 1991, an Employability Skills Development Network was established to serve as a communication point for continued efforts to help districts just beginning the development of their portfolio programs. The state goal was to have approximately 100 districts to be on the system by the fall of 1991. (Employability Skills — Helping Michigan Students Gain the Competitive Edge, 1991.)

Worklink — A system linking education with the workplace, was stimulated by needs identified in an article entitled "Why Apathy in American High Schools" (Bishop, 1989). Educational Testing Service first presented the concept at a meeting of human resource vice presidents of major corporations hosted at Cornell University. ETS then joined with the National Alliance of Business (NAB) which convened a meeting of business and other agency representatives to develop the concept.

Worklink includes four components:

(1) A reformatted high school transcript that's easy to read and interpret.

(2) A work skills assessment that covers such aptitudes as reading, using manuals, and everyday math and writing skills.

(3) Information on job-related behavior, including punctuality, timely work completion, and willingness to follow directions.

(4) Information on work experience and work-related or other out-of-school training.

Through workshops scheduled during the school day, high school seniors learn which skills are important to employers, how their individual achievements match up with those requirements, and how to develop a personal record that will help lead to employment.

Worklink provides a record of student performance including skills in reading, writing, and mathematics. It is designed as an assessment process based upon students' original work and work observations. School input options include student assessments, confidential teacher ratings of student work habits, and summarized student transcripts. Student input options include resumes of work experience, resumes of work-related training/special courses, description of portfolio contents (where applicable), description of competency check lists,

to use a new information system in recruiting and hiring certain entry-level employees. It requires school administrators and teachers to cooperate in developing and maintaining additional school records besides the traditional transcript.

Students, with encouragement from their parents if possible, must persist in developing and updating their personal Worklink record/resume. The system was piloted in Tampa, Florida in 1990, and collaboration with Pasadena, California was begun in 1991.

New York — The State Education Department has approached assessment from a different perspective through an Elementary Science Program Evaluation Test (ESPET). ESPET, which is based on the State syllabus, is designed to provide information to local and state educators on the effectiveness of the science program in each elementary building and to help the state determine where technical assistance may be needed. It was developed in conjunction with school administrators, classroom teachers, university staff and subject supervisors by modifying research studies and other elementary level science assessments.

ESPET was first administered in 1989 in 4,000 public and nonpublic elementary schools to approximately 200,000 grade 4 students. The test consists of two required components — a multiple choice test and a manipulative skills test — plus five optional surveys. Special effort is made to measure progress in those skills where student performance requires technologies other than written examinations, such as laboratory work, critical thinking, and problem-solving skills.

Five optional components are designed to gather additional information on other important dimensions of the local science program. The optional components are a Student Science Attitudes Survey and a Science Program Environment Survey, which includes surveys for students, teachers, administrators, and parents/guardians.

ESPET — is a program test, not a pupil achievement test and does not require student remediation. Instead, it indicates modifications needed in the program depending on the results and item analysis of the required and optional components.

If we are to assess the skills needed in our increasingly sophisticated workplace, we must have the courage to venture into uncharted territory. Despite the efforts of portfolios and authentic programs such as those noted above, we are still neophytes in this area. Most of us typically resist moving beyond the time tested paper and pencil, short answer type of examinations.

Educational leaders must find ways to nurture and reward testing and curriculum specialists who have the courage to abandon past testing techniques and move into the little known world of portfolios and authentic assessment. Our present testing programs, for the most part, are not measuring the skills, knowledge, and behaviors needed in the workplace, or for that matter, in society in general in the 1990s. Without new assessment instruments and techniques, we cannot reform our schools because, despite the rhetoric, assessment still drives instruction — not vice versa.

Call to Action!

Fundamental structural changes have occurred in the workplace, leaving unskilled workers structurally unemployable. Schools have not kept pace with these changes, leaving today's graduates with a large gap between what they need to function as successful adults and the skills they have when they leave our schools. The changing workplace does not simply demand higher standards but also different skills.

The first step in addressing this issue is to create a clear understanding of the growing gap between the skills youth and adults possess and those that they need. Comprehensive awareness programs are needed to provide this understanding. We must then be very precise about identifying the actual skills workers need. Commitment to research and development in this area is critical.

With the skills workers need clearly identified, we can act on the answers to the key policy issues, namely:

(1) The school-to-work transition initiative is for all students.

(2) Schools should address the total array of skills, knowledge, and behaviors needed for the workplace.

(3) Present curricula, disciplines, and programs should serve as a foundation for curriculum and assessment reform.

(4) We must balance the need to prepare youth for the world of work with preparing them for other adult roles.

Curriculum and assessment decisions will flow relatively easily if we have accomplished the above awareness, research, and policy-related work. Curriculum must be integrated across disciplines and placed on a continuum; assessment must move toward portfolios and authentic testing techniques; and staff must be provided extensive retraining so that educators come to own the changes being made.

Do we have the time and energy to travel this road to a restructured curriculum and assessment system? Do we have the fiscal resources to finance it? If our workers and businesses have any hope of competing in the global economy, we have no choice.

National Technology Awards Program

The National Association of State Directors of Special Education (NASDSE) invites you to participate in The National Technology Awards Program, a competition designed to identify, recognize and share exemplary programs using technology in the education of students with disabilities.

The National Technology Awards Program is sponsored by EduQuest - The IBM Educational Systems Company and the Mattel Foundation, and is administered by NASDSE.

NASDSE seeks to identify education programs that utilize innovative instructional technological applications that improve the educational outcomes for students with disabilities. Award winning programs will be determined on their ability to:

- utilize innovative applications of technology;
- treat student diversity through the utilization of technology;
- enable full participation of all classroom students in the learning activity:
- improve the educational outcomes of all student participants; and
- enhance classroom teachers's ability to improve overall classroom learning and classroom management.

A panel of distinguished judges will identify five finalists, including two National Award Winners, and several education programs that will recieve National Recognition Awards.

National Award winners will each receive an IBM PS/2 Model 35 computer and IBM Series products: THINKable, VoiceType, SpeechViewer II, KeyGuard, Screen Reader, an assortment of EduQuest courseware or equivalent to be determined by IBM, Mattel, and NASDSE. One representative from each National Award Winner will travel to the National Leadership Conference in Washington, DC in April 1993 and may travel to a national technology conference.

Other Finalists will receive IBM Series products: THINKable, SpeechViewer II, KeyGuard, Screen Reader, or equivalent to be determined by IBM, Mattel, and NASDSE.

All award winning programs will receive national recognition in **Counterpoint**, NASDSE's National Newspaper in Special Education.

NASDSE/MATTEL Foundation/EduQuest-
The IBM Educational Systems Company

National Technology Awards Program

Official Entry Guidelines

1) Programs from public, parochial, or private elementary, middle, junior high, or high school are eligible.

2) Eligible school buildings or programs will qualify as recipients of prizes. Team entries, entries of a project, teaching unit, or project models are valid entries.

3) Finalists and all other winners will be selected on the basis of their use of technology to enhance teaching methods.

4) A written description of the specific program must accompany the entry application.

5) The entry application, a maximum of four typed pages, should include the following:

- school name, address, phone/fax numbers, contact person.
- objective of the program
- description of students' involvement in the learning activity
- type of materials used, such as computers, multi-media, cameras, television, peripherals, etc.
- description of project results (such as before-and-after test scores, booklets, papers, anecdotal comments, exerts, posters, or other work created by students with disabilities).
- Samples of students work and/or a videotape illustration of the classroom program is encouraged as part of the entry submission, however, materials submitted will not be returned.
- application MUST be signed by the building administrator.

6) Entries incorporating any brand of computers or other technologies are eligible.

7) Entries MUST be postmarked by November 15, 1992. Entries become property of NASDSE and cannot be returned.

8) Winners will be notified by December 31, 1992. Contestants agree to allow EduQuest and NASDSE to use their entry, name, picture, voice, video clips, and/or likeness for editorial or promotional purposes.

9) NASDSE employees, EduQuest employees, their contractors and agents, and their immediate families are not eligible.

10) The competition is seeking to recognize those programs which have heretofore NOT received national or other unusual recognition or awards.

National Association of State Directors of Special Education, Inc.

1800 Diagonal Road, Suite 320, Alexandria, Virginia 22314

FIRST CLASS