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ABSTRACT

The United States Congress's Office of Technology Assessment (OTA) issued a report describing American corporations as "remarkably underdeveloped" when compared with the nation's leading international competitors. The OTA report indicated that training and retraining must be made available to the lower tier of poorly paid, unskilled and semi-skilled workers. One team of researchers has presented a model for establishing partnerships between businesses and educational institutions, in particular community colleges which the model views as uniquely suited to meet the needs of of such education/business partnerships. The goal of the partnership is to develop innovative programs to help improve the quality of education and training. One strategy to be utilized in making the partnership a concept viable is technology transfer. A special approach known as the Transformations Procedure was developed to facilitate technology transfer. The approach utilizes three phases of "hands-on" applied learning, resulting in job-related skills and a broad base of technical knowledge. The three phases are pre-tech, tech core, and tech specialty. The first two elements function as a common core of technical expertise to be mastered by all participants, while the last segment is tailored to meet the advanced technology needs of the individuals being served. The entire program consists of between 540 and 700 hours of classroom and laboratory instruction. The process is designed to rebuild the academic and technological foundation of shop-floor technical workers. The responsibility facing community colleges is to integrate Transformations as a bridge program within their own technology transfer strategies. (JMC)

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TECHNOLOGY TRANSFER: CONTINUING EDUCATION'S HIDDEN TREASURE FOR THE 21ST CENTURY

NCCSCE Annual Fall Conference

October 21, 1991

Corpus Christi, Texas

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Introduction: The Challenge

The 1990's may be characterized as a decade that symbolizes Dickens' famous adage--the best of times, the worst of times. American prestige has reached a new high as a result of Desert Storm. The potential for world peace has been enhanced by the breakup of the monolithic Eastern Bloc. Yet, the nation languishes in a continuing recession while workers capable of implementing ever-changing advanced technology are in short supply.

The problem is presented effectively by the U.S. Congress's Office of Technology Assessment (OTA). American companies, they suggest, will have to spend significant time and money training employees who, while on the job, lack the basic skills needed to perform effectively. The OTA considers American corporations to be "remarkably underdeveloped" when compared with the nation's leading international competitors. Their assessment has been taken seriously by the Bush administration.

In April 1991 the President released a plan for responding to the need for worker development. America 2000 is a long-range plan designed to overcome the problems besetting American society. The President presents the nature of the challenge in the following manner:

> If we want America to remain a leader, a force for good in the world, we must lead the way in education innovation. And if we want to combat crime and drug abuse, if we want to create hope and opportunity in the bleak corners of this country where there is now nothing but defeat and despair, we must dispel the darkness with the enlightenment that a sound well-rounded education provides.[1]

Along with his perspective, the President requested that all cabinet officers conduct reviews to identify implementation strategies. The Secretary of Labor, Lynn Martin, established a Secretary's Commission on Achieving Necessary Skills (SCANS). The group's report, What Work Requires of Schools, suggests that an American educational revolution is

needed. We must "create an entire people trained to think and equipped with the know-how to make their knowledge productive."[2] The plan is clear. A three-part foundation of communication skills, thinking skills, and personality qualities is designed to make five competency areas--resources, interpersonal skills, information, systems, and technology--operational. Martin's design is appropriate. If the potential of the 1990's is to be realized, America's work force must be given the opportunity to achieve their potential. Who are these individuals?

Who: The People in the Process

The challenge facing the American public school system is obvious. Not so clear is the status of the nation's work force. In 1989 the Department of Labor released a report entitled Labor Market Shortages. An essential statistic in the report is that eighty percent of all workers who will be employed in the year 2000 are already in the work force.[3] These individuals must have the opportunity to align their learning skills and competency mastery with the demands of advanced technology.

The OTA report identifies an emerging gap between the lower tier of poorly paid, unskilled and semi-skilled workers and an upper tier of technology and professional workers. As the need for a universal skill base increases, the need to make training and retraining available to the former group becomes evident. The management consulting firm, A. T. Kearney, has taken a comprehensive interest in how the process might be developed.

In Workplace 2000: The Revolution Reshaping American Business, Bagette and Conn of A. T. Kearney present a design that would create partnerships between education and business. The goal is innovative programs to help improve the quality of education and training. Emphasis will be placed on enhanced skills in the areas of communications, mathematics applications, and technology designs. Is there an educational agency well suited to implement the partnership process?

Where: The People's College

America's community colleges are uniquely suited to meet the challenge of education/business partnerships. According to the Institute for Future Studies at Macomb Community College (MI), "Our schools can produce quality workers. Preparing the new age worker . . . requires that corporate America [select] the work force strategy."[4]

The state of Illinois, for example, has adopted an operational strategy. Through I-TEC (Illinois Technology Education Council) community colleges have become the provider of technology application assistance and personnel training. Burger suggests "technology transfer assistance is simply a logical extension of . . . existing services. The strength of the model is that it provides a true network and access . . ."[5] for those most in need of skill development.

Finally. Edling summarizes the case for community colleges. "The demands of industry training and technology transfer . . . require new organizational approaches, new program designs and new attitudes toward the nature of services delivered by community colleges."[6]

The issue has been articulated. The challenge is to create "world class" workers capable of meeting the demands inherent in the advanced technology of the 1990's. The individuals most in need of assistance are those already employed along with the out-of-school, unemployed and underemployed. The procedure is a partnership between community colleges and business. What strategy is best suited to making the partnership concept viable?

Strategy - Technology Transfer

Technology transfer is a relatively new phenomenon. Significant attention has been paid to the development of advanced technology in America's research universities and industrial research and development settings. How this technology was to reach the application centers and be transmitted to the workers who would implement it was, in the main, neglected. In 1986 Davis presented two essential questions. "(1) How can the dissemination and adoption of advanced . . . technologies be facilitated in order to improve the productivity and international competitiveness of American firms? (2) Once adopted, how can advanced . . . technologies be implemented and managed so as to achieve the maximum possible productivity gains?"[7] Community colleges have begun to emerge as centers of technology application and training. Brient-Smith reports that community colleges provide education, training, and consultation services designed to enhance awareness and promote the identification and adoption of advanced technology appropriate to the college's service area. Special emphasis is placed on rapid response and training delivered at a level useful to the trainee. Many colleges entered into shared use agreements with their business/industry partners designed to

conduct technology transfer activities in the business/industry setting at times when facilities were not in use.[8]

Technology transfer is beginning to have an impact. The need for work force development, while obvious, did not lend itself to a "quick fix." The average client for skill upgrading had not been involved in formal education for two decades. Also, work place literacy as described by President Bush and Secretary Martin required a higher level of competence than originally estimated. Finally, materials and equipment designed to assist workers in mastering advanced technology and integrating appropriate processes into their work setting did not exist. The challenge became to develop a strategy that would enhance the effectiveness of technology transfer.

Hull and Parnell present a viable scenario. The solution for adult [learners] is to upgrade their academic foundation and then build new technical skills on the upgraded and receptive base. Further, special attention must be given to maximizing effectiveness and enhancing the ability of the participants to apply the content of training to their job environment.[9] If technology transfer is to work, a process specifically developed to meet the unique mix of advanced technology, worker skill development and quick response had to emerge. Such a process is available.

The Process: Transformations

Meeting society's demand for academically knowledgeable, technically adept workers requires an innovative process. The Transformations strategy was designed by the Center for Occupational Research and Development (CORD). The approach includes three phases of

"hands-on" applied learning resulting in job-related skills and a broad base of technical knowledge. The elements are pre-tech, tech core, and tech specialty (see Table 1). The first two elements function as a common core of technical expertise to be mastered by all participants. The last is tailored to meet the advanced technology needs of the people being served. The entire program consists of between 540 and 600 hours of classroom and laboratory instruction.

The process is designed to rebuild the academic and technology foundation of shop-floor technical workers. The challenge is that these individuals have a history of academic underachievement, little confidence in their ability to learn, and limited motivation. The design uses a progression from basic concepts through specific applications to specialized technical expertise to overcome the technological illiteracy syndrome.[10] Applications in Texas, Ohio, and Michigan suggest that the model is effective with the target population.

The responsibility facing community colleges is to integrate Transformations as a "bridge program" within their technology transfer strategy. Integration will insure that the institutions continue to meet the needs of all sectors of their entering population. Further, inclusion will ensure that the institutions are effective in developing the advanced technology work force for their service area. Table 2 describes the process of integrating a "bridge program" into a tech-prep curriculum.[11] Is there a vehicle within the community college delivery system that is ideally suited to applying the Transformations process?

Conclusion: Community Services and Technology Transfer--Unveiling a Hidden Treasure

In 1988 the AACJC formed a commission on the future of community colleges. The group's report, Building Communities: A Vision for a New Century, presents the role of community services in community colleges eloquently. "We define the term 'community' not only as a region to be served, but also as a climate to be created." Community services, therefore, will "perform a convening function" through which the needs of various clients and interest groups can be identified, aggregated, and met.[12] The creation of a climate of response to advanced technology through technology transfer is the essence of the role.

In 1989 Gollattscheck reinforced community services' role in the 1990's. Community services educators "have the expertise of [identifying] community need, in [designing] nontraditional delivery of education and [in being] connected with the community."[13] He considers their expertise essential to explaining, defining, developing, and implementing processes for engaging technology transfer. Community services educators have the potential to lead the colleges in restructuring the advanced technology work force for the 21st century.

President Bush's joint statement with the nation's governors is precise. "We have started down a promising path. We have entered into a compact--a Jeffersonian compact to enlighten today's [citizens] and the children of generations to come. The time for rhetoric is past; the time for performance is now."[14] If community services educators unearth the hidden treasure of technology transfer through Transformations, they will lead the process. I suggest, if not us, who? If not now, when?

TABLE ONE

Transformations

The "Bridge" Program for Adults Entering Advanced Skills Training

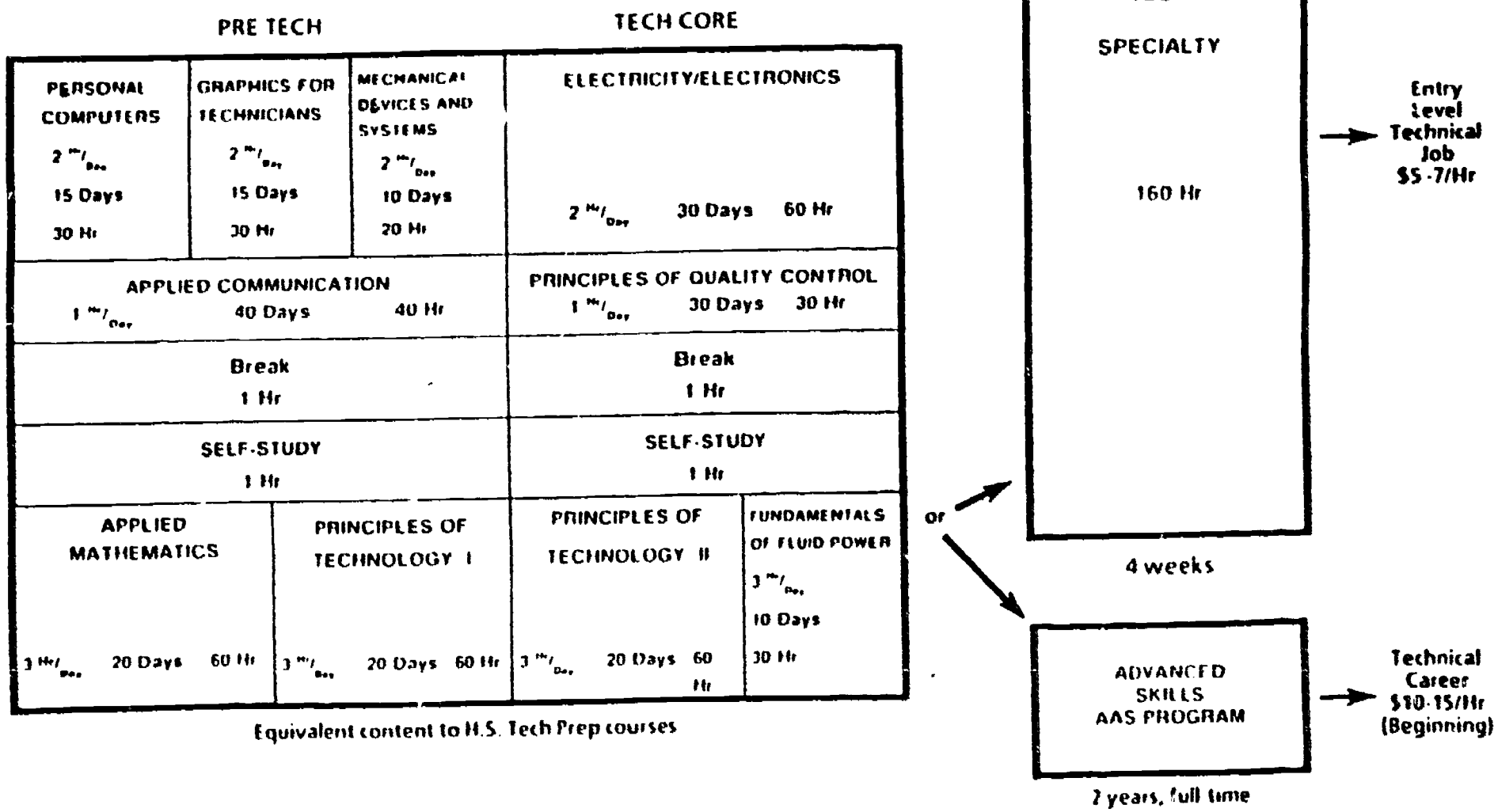
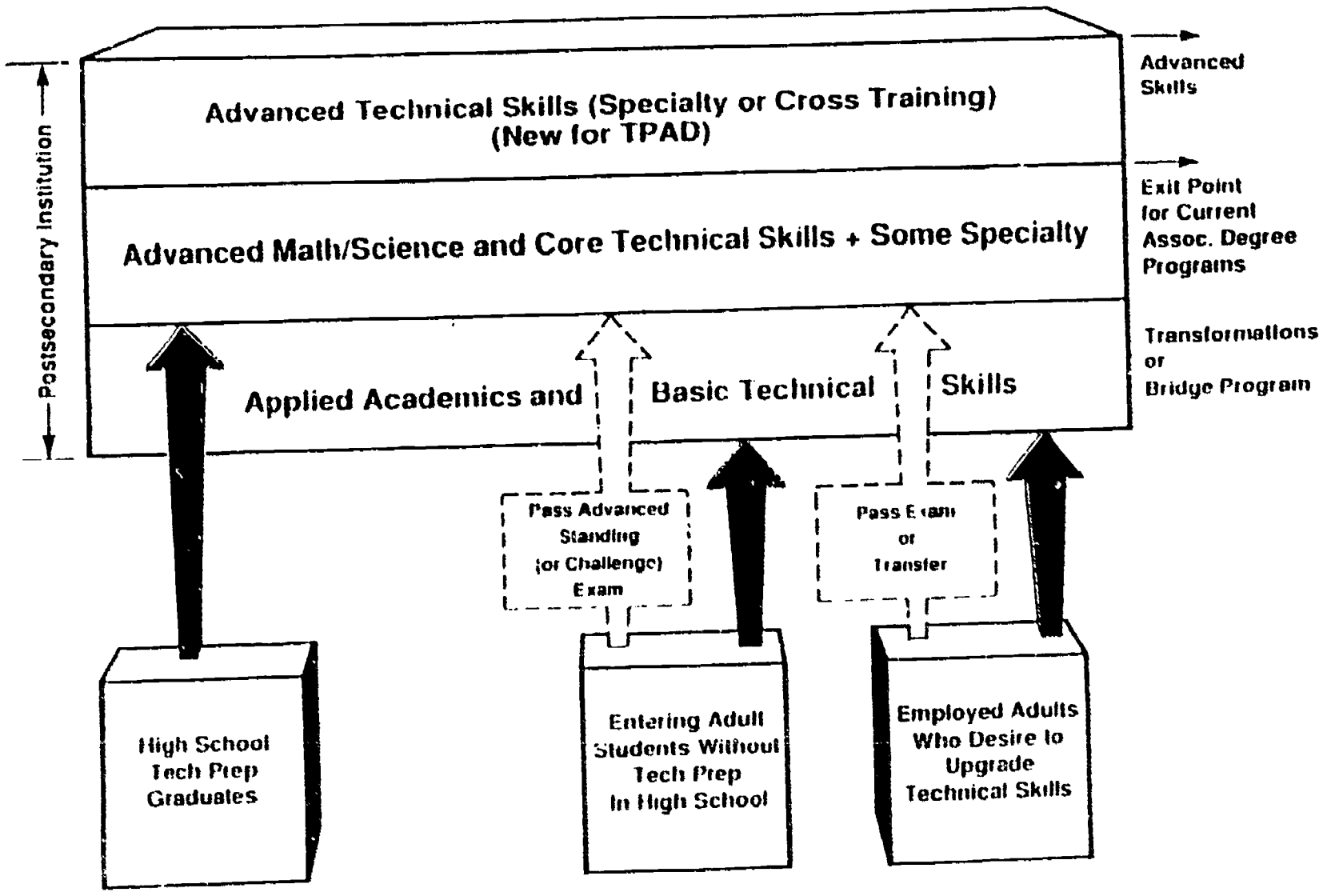


TABLE TWO

HOW DOES A "BRIDGE PROGRAM" FIT INTO A TECH PREP CURRICULUM?



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