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ABSTRACT

The Secretary's Commission on Achieving Necessary Skills (SCANS), established as a result of the America 2000 strategy proposed by President Bush in 1991, stressed the importance of helping all students develop competence in the following areas: resources, interpersonal, information, systems, and technology. The three-part foundation identified by SCANS consists of basic skills, thinking skills, and personal qualities (e.g., self-esteem, sociability, and responsibility. Also stressed are: information utilization skills; interpersonal relationships/personal development; and ability to understand and work with systems and various technologies. The Partnership for Academic and Career Education (PACE), a business and education consortium involving various South Carolina schools/community colleges, businesses/industries, and the National Dropout Prevention Center at Clemson University, is working to improve delivery of such training to all students, regardless of their postgraduation goals. Through their tech prep initiative, the PACE partners are working to develop innovative programs to increase students' motivation to graduate from high school and pursue occupational training at two-year colleges. Clemson University's Department of Industrial Education (DIE) is also working to facilitate tech prep articulation by offering a broad range of programs to prepare students for teaching positions and occupations within the framework of human resource development/industrial training in the private sector. Through an informal articulation process with South Carolina's technical colleges, the DIE has given many technical school graduates the opportunity to continue their education without duplication of courses and with minimum interruption. (MN)

Tech Prep Articulation: Making it Work

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A serious concern of many business leaders in the United States is the fact that many high school graduates are not being adequately prepared for the work force of the future, and as a result will not be able to meet the challenges that are being created by changes in technology. There are also those who believe that the primary reason for our stagnant economic situation is our inability to prepare our present generation of worker with the appropriate skills necessary to compete in a very competitive global labor market. As noted in a Wall Street Journal article in 1990, "Jobs are becoming more demanding, more complex. But our schools don't seem up to the task. They are producing students who lack the skills that business so desperately needs to compete in a global economy. And in doing so, they are condemning students to a life devoid of meaningful employment." Throughout the decade of the eighties, educators have attempted, through innovative programs and the use of new technology, to meet this criticism of business and industry. However, little has occurred in the actual restructuring of our schools that will enable our education system to meet the challenges of the future. Even with changes in our education system, we are still producing graduates who, in the eyes of many, are not qualified for the current or future job market.

A Japanese leader once characterized the American worker as being lazy and having a poor work ethic as compared to workers in other countries. Even though these remarks are offensive, American workers may be doing the best they can with the skills they have been provided for today's job market. In defense of our education system, the United States is a much more culturally diverse nation. In a time when global competitiveness is so important, cultural diversity should be a major advantage that will enable our nation to be much more competitive in the world market.

Despite numerous educational reform efforts by educational researchers, curriculum writers, administrators, and teachers to meet the needs of a changing workplace, students are still entering the job market lacking the necessary skills. However, in an effort to provide direction to the education community, there have been many reform reports within the last decade. One of the more recent, and what some consider significant, reports is the SCANS. The Secretary's Commission on Achieving Necessary Skills (SCANS) was established as a result of the America 2000 strategy proposed by President Bush in April,1991. As proposed by President Bush, America 2000 would provide a new direction for education in this country in an effort to better prepare students for the future. In addition to the Secretary of Labor, Lynn Martin, the Commission was comprised of 31 leaders from the fields of business, labor, education, and government. The SCANS report "What Work Requires of Schools" was based upon the examination of all manner of jobs ranging from manufacturing to government employment. Data for the the research were compiled through lengthy interviews with workers in a wide range of jobs. Discussion with business owners, public employees, and unions also assisted in the development of this report. Recognizing that students are entering a job market ill prepared for the diversity of jobs that have developed in the workplace as a result of vast changes in technology and resulting economic globalization, the Commission "was asked to examine the demands of the workplace and whether our young people are capable of meeting those demands". Recognizing that the

workplace of today is vastly different than that of only a few years ago, the Commission noted that, as in the past, most workplaces of today require the worker to be involved with repetitive work, organized along hierarchical lines, that require little thought by the worker as to what he or she is doing. The SCANS report recognized that workplaces organized along these traditional production lines cannot continue to compete as in the past.

The Commission cites the lack of educational improvement as a result of miscommunication between the education and business communities. Lacking specific direction, schools have "continued to use basically the same system for the past century for the needs of a workplace that is vastly different". Schools do not provide students with a true understanding and relationship with the "real world." According to the SCANS research, students believe that job skills are "learned on the job, by hands on experience, through extra curricular activities, or by osmosis." The resulting research by the SCANS defines effective job performance for any job classification as "workplace know-how". The report identifies eight requirements that are the center of effective job performance and are essential preparation for all students, whether they are going directly into the workplace or continuing their education.These eight requirements are comprised of five competencies and a three-part foundation of skills and personal qualities. The five competencies identified by the commission are:

Resources: Identifies, organizes, plans, and allocates resources

Interpersonal: Works with others

Information: Acquires and uses information

Systems: Understands complex inter-relationships

Technology: Works with a variety of technologies

The three-part foundation as identified by the SCANS is:

Basic Skills: Reads, writes, performs arithmetic and mathematical calculations,listens and speaks;

Thinking Skills: Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn, and reasons;

Personal Qualities: Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.

According to the SCANS Report, high school students have a difficult time associating "school work" with "real work". Students believe that job skills, as one student put it, are just "picked up". The massive training budgets of today's corporations are powerful evidence that work force know-how cannot simply be "picked up".

Having been identified as one of the premier educational reform reports of the 1980's, "A Nation Prepared: Teachers for the 21st Century" was a comprehensive look at one of our nation's most vital professions. The report was the result of a vast study by a 14 member Task Force established in January, 1985 by the Carnegie Forum on Education and the Economy. The Task Force on Teaching as a Profess' was comprised of distinguished leaders in education, business, journalism, public servic , and science.

The major themes of this report centered around two primary developments that occurred during the 1980's. The task force identified these developments as "the beginning of a sweeping reassessment of the basis of the nation's economic strength and an outgoing of concern for the quality of American education". A major concern of the task force was that for the United States to remain competitive in a highly technical international market, we will require a well educated and highly skilled work force.

As this report noted, our elementary and secondary system of education was developed for an economic society established around a system of mass production, and there is a very close similarity between the routine and repetitive skills required of both systems. Employers were finding that graduates of this educational system find it difficult to perform complex work, "do not learn easily on the job, are unable to read complicated material, evaluate or make complex arguments, write well, or apply quantitative concepts and methods to unfamiliar problems". It is therefore the conclusion of the task force that for the United States to maintain and increase its standard of living, our education system must provide a higher quality of instruction to a larger populace. If the United States is to remain competitive, we as a society must begin to take change seriously. We do not have anything to lose except our future. We must work together for change by providing graduates of our educational system with the skills to be technologically literate
and competent in the basic skills.

Colleges and universities must take a leadership role in directing change through research and educational reform. New curriculum must be implemented to teach what we know is right, and not what we were taught in the past. Programs must be developed to involve parents and the community. Joint efforts between industry and the local schools must be implemented. A restructuring of schools, and consequently a change in the way we educate our children, is vitally and urgently needed.

One such effort is the Partnership for Academic and Career Education (PACE) . Established in 1987, PACE is a business and education consortium invoiving the three school districts of Anderson, Oconee and Pickens counties, local businesses and industries, Tri-County Technical College, area education agencies, and the National Dropout Prevention Center at Clemson University. Through the Tech Prep (PREParation for TECHnologies) initiative, it is the philosophy of the PACE partners that cooperation in developing new and innovative programs will result in more young people who can be motivated to graduate from high school and pursue occupational training at two- year colleges. These students will be better prepared to enter into the work force with strong academic and job-related skills.

Located only a few miles apart, Tri-County Technical College (TCTC) in Pendleton, South Carolina and Clemson University have worked closely for years in providing students unique opportunities to complete their degrees. The recent Tech Prep initiative has further opened new opportunities for broader cooperation between these two institutions, therefore continuing to provide students with even greater opportunities.

As a prelude to Tech Prep, Tri-County Technical College Engineering Technology coordinator Dr. James Wood originated the term Technical Advanced Placement (TAP). TAP is the means through which high school students may apply credit earned in selected vocational/career center programs towards credit for courses at TCTC. In addition, through teacher in-service programs and curriculum projects, the Department of Industrial Education at Clemson has provided direction for the implementation of applied math and applied science courses in many high school programs.

The Tech Prep initiative is an outgrowth of numerous studies and national reports during the last decade which have mandated a restructuring of our educational system. Two of these studies, "A Nation at Risk" and "SCANS", as previously discussed, emphasized the need for a technologically literate work force if the United States is to remain globally competitive. To meet these objectives, there is the realization that a high school diploma as we know it today is not sufficient to provide the type of worker that a highly technical society requires. According to Cetron (1988), "when the class of 2000 graduates, only 15% of jobs will require a (four year) college education, but nearly all will require job specific training after high school". Students leaving high school programs must be prepared to continue their education, whether it is through a technical school, business sponsored education program, community college, or four year university. In an effort to provide all students with the necessary skills and competencies, the high school curriculum must become more relevant and applied. In the past, many high school students entering higher education programs or the work force have required extensive remediation and help that is a waste of time and resources for both the student and institution. "....the skills deficit has already cost businesses and taxpayers $20 billion in lost wages, profits and productivity. Another estimate frequently bandied about is that corporate America is spending $300 million a year on remedial three R's training for employees" (Zemke, 1989). Tech Prep is an effort to help alleviate the need for remediation and help prepare students for the world beyond high school.

Through a federally funded project, the Department of Industrial Education at Clemson has joined with the PACE Consortium to study the development of a formal articulation program that will enable students to progress from a high school Tech Prep program to Tri-County Technical College and on to Clemson University. The primary focus of this study is to develop a process by which students in Tech Prep programs may continue their education beyond the technical college level without duplication of course work and which will allow for a smooth continuation of the educational process without interruption. At the present time, this study centers around the vocational-technical education option within the Department of Industrial Education. Upon graduation from this option, students will be certified to teach in high school vocational programs.

The Department of Industrial Education, located in the College of Education at Clemson University, offers a broad diversity of programs for both undergraduate and graduate students. The Bachelor of Science degree in Industrial Education is designed to prepare students for professional teaching positions, as well as occupations within the framework of human resource development/ industrial training in the private sector. The undergraduate student is afforded the opportunity to select one of three options: Human Resource Development, Industrial Technology Education, or Vocational-Technical Education. At the present time, each option requires 135 semester hours of course work.

The following descriptions have been taken from the 1993-1994 Clemson University Undergraduate Announcements:

The Human Resource Development option is designed to prepare students to enter industry or business as training and development specialists. The curriculum provides participants with a broad exposure to industrial processes in the areas of manufacturing, construction, power/transportation, and communications. Numerous hands-on experiences related to the application of technology in industry are integrated with valuable skills and knowledge from the training and development profession. Students will exit the program with skills related to analyzing needs; conducting job and task analyses; designing, marketing, and evaluating training programs; delivering professional presentations; and developing instructional materials.

The Industrial Technology Education option is for students who desire to teach industrial technology in the secondary schools (9-12). Industrial technology is the subject area in the public school system which attempts to provide youth with an interpretation of American industry. It is a general education subject designed to give students exploratory experience in the classroom and laboratory. Majors in this option are qualified to seek certification as secondary school teachers of industrial technology, prevocational, and industrial arts education.

The Vocational-Technical Education option is designed to prepare teachers of vocational and technical subjects in the senior high schools, area vocational centers, and technical education centers. All elective courses in this option will be in an area of specialization or related fields. Teachers graduating from this option will possess the skills and knowledge required to teach the occupation or family of occupations in their area of specialization.

As with other degree programs, many students enter into the Department of Industrial Education in a variety of ways. Processes vary from the traditional freshman entering from a high school program, to transfer students from two or four year institutions. Students admitted to Clemson are given the opportunity to transfer courses that are deemed acceptable by the department for which they are applying. General education courses from an accredited institution are evaluated on a course by course basis to determine whether or not the course will be accepted for transfer.

Technical credits earned from technical colleges present a unique situation for four-year universities in providing transfer credit. There are few programs that provide for a one-to-one transfer of courses due to the nature of the technical courses. Through an informal articulation process with the technical colleges in South Carolina, the Department of

Industrial Education has provided the opportunity for many technical school graduates to continue their education without duplication of courses and with minimum interruption. The Vocational-Technical Education Degree allows students to transfer a block of 30 hours of technical credit towards the degree. Through other elective credit and transfer of 100 and 200 level general education courses, it is feasible that a student would only need to complete a remaining 48 hours of course work at Clemson. As a result of this process, many of South Carolina's career center and technical college instructors have, in addition to obtaining certification, been afforded the opportunity to complete their degrees. Not only has this process provided continuous learning opportunities for many students who would not have otherwise continued the process, it has also continued to provide South Carolina with a strong and well prepared vocational-technical teacher pool.

The concept of this 2+2+2 program is not necessarily unique to PACE and Clemson University. However, new and innovative avenues are being studied that will provide numerous benefits for everyone involved. The concept of providing students Technical Advanced Placement (TAP) credit in high school, that would eventually apply toward a four year Bachelor of Science degree, is a new and somewhat disturbing idea to some. Under the strict process and guidelines of accreditation of all institutions involved, these courses are no less creditable than any academic course taken and presented for waiver of credit. The close working relationship that results from a formal articulation agreement ensures the quality of each course and scrutiny of curriculum to the satisfaction of the institutions involved.

Discussion is presently focused on the implementation of school-to-work transition programs, and in particular, on youth apprenticeship programs. These types of programs are viewed as a vital link between the formal education environment and the work environment. It is feasible that students will be able to work in a three year apprenticeship program from high school through the technical college. Upon completion of the technical college program, students who so desire could possibly transfer into a four-year university. As in the case of Clemson University, students might complete programs in the area of vocational-technical education or in the field of training and development. Graduates of both programs would be well qualified and highly sought after for their work experience and solid educational background. Currently, it is generally accepted that very few graduates of a four-year university have the competencies that this type of educational process would provide. "School-to-Work" programs will provide students with relevant experiences that allow for practical work experience. As a result of an improved articulation process between the high school, technical college, and four-year university, students will be assured of a "seamless transition" through the educational process.

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Additional information on these and other related programs may be obtained by writing or calling the following:

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