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ABSTRACT

The Committee on Technological Literacy has defined "technology" comprehensively as "the tangible objects of the human world and the systems of which those objects are part, as well as the people, infrastructure, and processes required to design, manufacturing, operate, and repair the objects." By adopting this comprehensive definition when relating to occupations and career fields, high school/high-tech program operators will be able to assist students in acquiring a wide range of internship and job shadowing opportunities and avoid limiting work experiences to those solely within the computer and electronic fields. Although some of the 30 occupations projected by the U.S. Department of Labor to grow at the highest rate and have the highest incomes between 2000 and 2010 may not typically be viewed as "high-tech," they all require high-tech skills for successful employment or else are located within the technology sector. High school/high-tech students and program operators can obtain information about each of the aforesaid jobs identified by the U.S. Department of Labor by accessing the Occupational Information Network (O*NET). They can use O*NET for the following purposes: find occupations to explore; search for occupations using specific skills; view occupation snapshots and details; use crosswalks to find corresponding occupations in other classification systems; and connect to other online career information resources. (MN)

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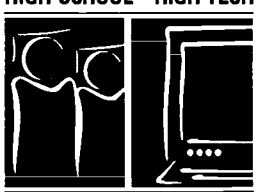

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Labor Market Trends for Technology-Focused Occupations and Career Fields: Implications for High School/ High Tech Program Operators

"Technology" is one of those terms with a multitude of definitions. For some, technology means, the modernization of society by the invention of the personal computer, answering machines, voicemail, and the Internet; while for others it means biotechnical and medical research, semiconductor transmitters, and genetically-driven engineering. Much of the research concludes that the term "technology" is anything but easily defined, nor is there a general acceptance of exactly which industries to include.

For the purpose of this paper and its intended audience (High School/High Tech program operators, and those who value work-based learning opportunities for all students), the term "technology," when relating to occupations and career fields, will be comprehensively defined as follows:

> *The tangible objects of the human designed world (e.g., bridges, automobiles, computers, satellites, medical imaging, devices, drugs, genetically engineered plants) and the systems of which these objects are a part (e.g., transportation, communications, healthcare, food production), as well as the people, infrastructure, and processes required to design, manufacture, operate, and repair the objects [adapted from the Committee on Technological Literacy, Technically Speaking, 2002].*

This comprehensive definition will allow High School/High Tech program operators to assist students in acquiring a wide range of internship and job shadowing opportunities, thereby not limiting work experiences to those solely within the computer and electronics fields (the more common and narrower public conception of technology). At the same time, varied opportunities and practicum will allow students to continually reinforce the

soft skills that are certainly needed to compete in our technologically changing and continually advancing society. But, the question still remains, "What are the technology jobs of the future?"

In December, 2001, the Bureau of Labor Statistics, United States Department of Labor, released projections for employment through the year 2010. The fastest growing occupations nationwide were, not surprisingly, noted to be in the technology areas of computers and networking; more specifically computer software applications engineers, computer support specialists, computer software and systems software engineers, and network and computer systems administrators. Since these occupations require training and experience at the post-secondary level (from a computer-related associate's degree to a bachelor's degree in a related field), students need to be mindful of academic requirements and pre-requisites when pursuing their technology career of choice.

According to Monthly Labor Review, projections until 2001 show high technology and related technology employment growing more than twice as fast as employment in the economy as a whole. By 2006, high-tech employment is projected to account for over 15 percent of total employment. Employment in this category includes the following areas: computer and data processing services, motor vehicles and equipment manufacturing, management and public relations services, engineering and architectural services, and electronic components and accessories manufacturing.

The April 29, 2002 issue of Newsweek magazine polled a panel of experts from business, government, and education to discuss up and coming technology careers. When asked about the top technology career fields over the next decade and beyond, Paul Saffo, director of the Institute of the Future, concluded that "biotechnology is poised for major expansion over the next two decades and will generate both new jobs and new kinds of jobs, much as the information revolution did in the last twenty years."

Biotechnology is an industry that cuts across and involves a variety of disciplines (molecular, agricultural, computers, medicine, and pharmaceutical). Not only does the field employ researchers, biologists, chemists, physicists, geneticists, and physicians, but successful biotechnical endeavors also need science-oriented entrepreneurs, venture capitalists, marketing mavens, research & development (R&D) scientists, consultants, technical support people, and legal and business experts (Barron, Janet J., High Technology Careers, 2001).

Fasting Growing Occupations and Largest Increase in Employment

Lastly, the United States Department of Labor, in the most recent version of the Occupational Outlook Handbook, has listed the fastest growing occupations and occupations projected to have the largest increase in employment between 2000 and 2010. In order to help High School/High Tech sites share this information with their student population, the list is presented in alphabetical order by career, with specific reference to the level of education and training needed to pursue each career (Table 1). Noteworthy are the number of occupations within the medical or biotechnical community. According to the comprehensive definition of technology mentioned earlier, these occupations should be classified as technology-focused.

Included in Table 1 are the Occupational Information Network (O*NET) codes for each career listed. O*NET, a comprehensive database of worker attributes and job characteristics, is the online replacement of the Dictionary of Occupational Titles. The O*NET database contains information about the particular knowledge, skills, abilities (KSAs), interests, general work activities (GWAs), and work contexts needed by and for all occupations. O*NET is readily accessible, interactive, and can be accessed from any computer with Internet access by logging onto: http://online.onetcenter.org/main.html

TABLE 1: Fastest Growing Occupations and Occupations Projected to have the Largest Increase in Employment between 2000 and 2010

CAREER FIELD	O*NET CODE	EDUCATION CODE
Astronomer	24102B	6
Audiologist	32314	6
Biological or medical scientist	24311	6
Chiropractor	32113	6
Computer and information scientist	211114C	6
Computer and information systems manager	13017C	5
Computer software engineer, applications	22127	4
Computer software engineer, systems software	25102	4
Computer support specialist	25104	3
Database, network and computer systems administrator	25103A	4
Dental assistant	66002	1
Desktop publisher	43-9031	2
Medical and health services manager	15008B	5
Medical assistant or technician	66005 and 66099A	1
Medical records and health information technician	32911	3
Mental health and substance abuse social worker	27302	6
Network systems and data communications analyst	25199A	4
Occupational therapist assistant	66021	3
Optometrist	32108	6
Pharmacist	32517	6
Pharmacy technician	32518	1
Physical therapist	32308	6
Physical therapist assistant	66017	3
Public relations manager	34008	5
Respiratory therapy technician	32302	2
Speech-language pathologist	32314	6
Surgical technologist	32928	2
Telecommunications line installer	85599A	1
Veterinarian	32114A	6
Veterinary technician	79806	3

Education Codes:
1 = Long term on-the-job training
2 = Postsecondary Vocational Award
3 = Associate Degree or Certification Program
4 = Bachelor's Degree
5 = Work experience plus Bachelor's or higher Degree
6 = Master's or first professional Degree

NOTE: This table includes occupations in the area of "technology," according to the definition on Page 1. Though some of these occupations may not typically be viewed as "high-tech," high tech skills are either needed for successful employment, or the position can be found in the high-tech sector.

This Information Brief was written by Lisa Cuozzo of TransCen, Inc., and published by the Institute for Educational Leadership for the National Collaborative.

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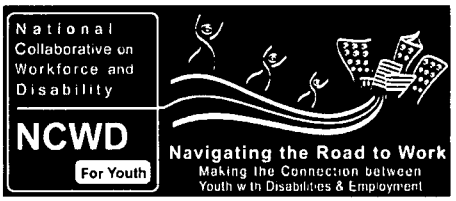

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High School/High Tech students and program operators can access O*NET in order to:
- Find occupations to explore;
- Search for occupations that use specific skills;
- View occupation snapshots and details;
- Use crosswalks to find corresponding occupations in other classifications systems (such as registered apprenticeships and military occupations); and
- Connect to other on-line career information resources.

In addition to O*NET as a source of career investigation for High School/High Tech students and Program Operators, additional strategies for technology career exploration include, but are certainly not limited to:
- Site visits to the local One-Stop;
- Student-run entrepreneurships and in-school businesses;
- Field trips to post-secondary institutions offering training and certification in the "fastest growing occupations; and
- Acquiring a speakers list from the selection of career fields mentioned in Table 1, especially in the area of medical- and biotechnology.

In conclusion, according to current research and statistics regarding future employment trends, programs geared at promoting science, math, engineering, and technology careers should unquestionably be geared for success. Since this is the mission of the High School/High Tech Programs nationwide, this is very good news!

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