

Short Term Projections of Occupations and Industries in Tennessee for 2008 and 2009 with Associated Wages, Training, Skills, and Knowledge: Growth Expected in Social Services, Network Systems, Home Health Aide, Teaching in Self-Enrichment, Graduate Assistant, and Chemistry Teacher Occupations

Summary

Tennessee is expected to show a 0.6 percent average annual increase in employment in 2008 and 2009 according to Department of Labor and Workforce short-term projections. About 34,580 new jobs are expected from the second quarter of 2007 to the second quarter of 2009. Goods-producing jobs are likely to have an average annual 2.0 percent decline for 2008 and 2009, but services-providing jobs expected to grow annually at 1.2 percent. "Other services (except government)" are expected to grow at 2.0 percent or more; as are educational services and health care and social assistance. Industry sectors growing between 1.0 and 2.0 percent annually include arts, entertainment, and recreation; accommodation and food services; management of companies and enterprises; transportation and warehousing; and wholesale trade. Industry employment growing at or above the average rate for the state includes professional, scientific, and technical services; information; and real estate and rental and leasing. Industries expected to grow less rapidly than the state average include agriculture; retail trade; construction, finance and insurance; and administrative and support and waste management and remediation. Government is expected to be stable. Utilities, mining, and manufacturing are likely to have some net job losses for the two years.

Occupations are listed by growth rates and the number of new jobs they offer. Among detailed occupations, social and human service assistants, network systems and data communications analysts, home health aides, self-enrichment teachers, graduate teaching assistants, and chemistry teacher occupations are projected to have strong growth rates in 2008 and 2009. Expanding occupational groups include community and social services; healthcare support; education, training, and library; healthcare practitioners and technical; and personal care and service occupations. Half the job growth is expected in three major occupational groups rich in number of jobs, and in variety of job opportunities. These groups are food preparation; education, training, and library; and healthcare practitioners and technical.

Providing workers adequate training and education brings positive outcomes for workers, including higher pay, successful international competition, increased productivity, technological savvy, worker versatility, and employee retention. Satisfied workers are more likely have a good match between pay, training, effort, and personal interest. Educational programs responsive to employment change can help the state transition from low wage manufacturing to knowledge-based industries. Skills necessary for the growing industries include active listening, reading comprehension, speaking, time management, and critical thinking. Knowledge requirements include customer and personal service, foreign language, physics, administration and management, and English.

Short-term projections show Tennessee's employment is likely to slow to a 0.6 percent average annual increase in 2008 and 2009. About 34,580 new jobs are expected from second quarter 2007 to second quarter 2009. Historical and projected demographic and economic variables provide trends used to project statistically future employment in industries and occupations in Tennessee. Projections are used extensively by public officials, industries, employers, and employees.

Social Services, Education, and Health Care Continuing Growth During Slowdown

Industries providing services continue to grow more than those producing goods. Service-providing industries comprise 80.6 percent of the economy, while goods-producing are 19.4 percent. Employment in goods-producing industries is projected to slow down in the short term (Table 4, page 11, and Figure 1, page 3). Service occupation sectors show greater growth for 2008 and 2009 than production and construction (Figure 2, page 4). Service industries are expected to average 1.2 percent growth over the two years (Table 4, page 11). Demographic factors play an important role in this weakening economy, since services to people remain relatively constant even in a downturn. Service needs for Tennessee's population are in step with the nation, with an aging population (Arik, 21) requiring more health care and food services (Arik and Wang, 26-27).

Reflecting the age distribution of Tennessee's population, occupations in social and personal services, healthcare, education, and food services will lead the employment growth the next two years. Tennessee's increasing population¹ will require a growing supply of educators, trainers, and libraries. Education will become increasingly multi-lingual and international, with contact requiring use of other languages and knowledge of the markets of other cultures.

Science and Technology Act as Engine during Economic Slowdown

Agriculture continues to evolve technologically and scientifically to serve and feed the growing population of Tennessee. With the advent of bio-fuels and bio-medication, agriculture has bridged the gap into the energy and medical fields. Computer technology and mathematics continue to be important across all industries, serving the growing service industries (Figure 2, page 4), and increasing productivity in the goods-producing sector (Figure 3, page 4). Network systems and data communications occupations are expected to continue their rapid growth even as general employment conditions slow.

International competition touches some service industries, through highly efficient communication by powerful Internet, satellite, and land connections (Federal Trade Commission, 2006). Service industries such as help desks and customer support for information, formerly fairly isolated from international competition, now face

¹ Tennessee's population grew 1.4 percent per year from July 2005 to July 2007, in being the 14th state in rate of growth and the 9th state when listed by growth in number of citizens (<http://www.census.gov/popest/states>). The United States ranks at 2.1 in total fertility rate, the expected number of children born per woman, based on 2005 age-specific data (Wikipedia). Most if not all, other industrialized countries have fertility rates at 1.9 or less. The U.S. has a population that is increasing about one percent per year, making the United States the fastest growing industrialized nation (Moss, Voice of America).

competition through enhanced communication capabilities. As national industries have matched competition of goods through increased productivity, such as enhanced computer capabilities and improved work techniques², so likewise now they must compete for services. Cross-cultural knowledge is essential to industries in a global environment. The Internet increases the reach of the consumer across national and continental boundaries.

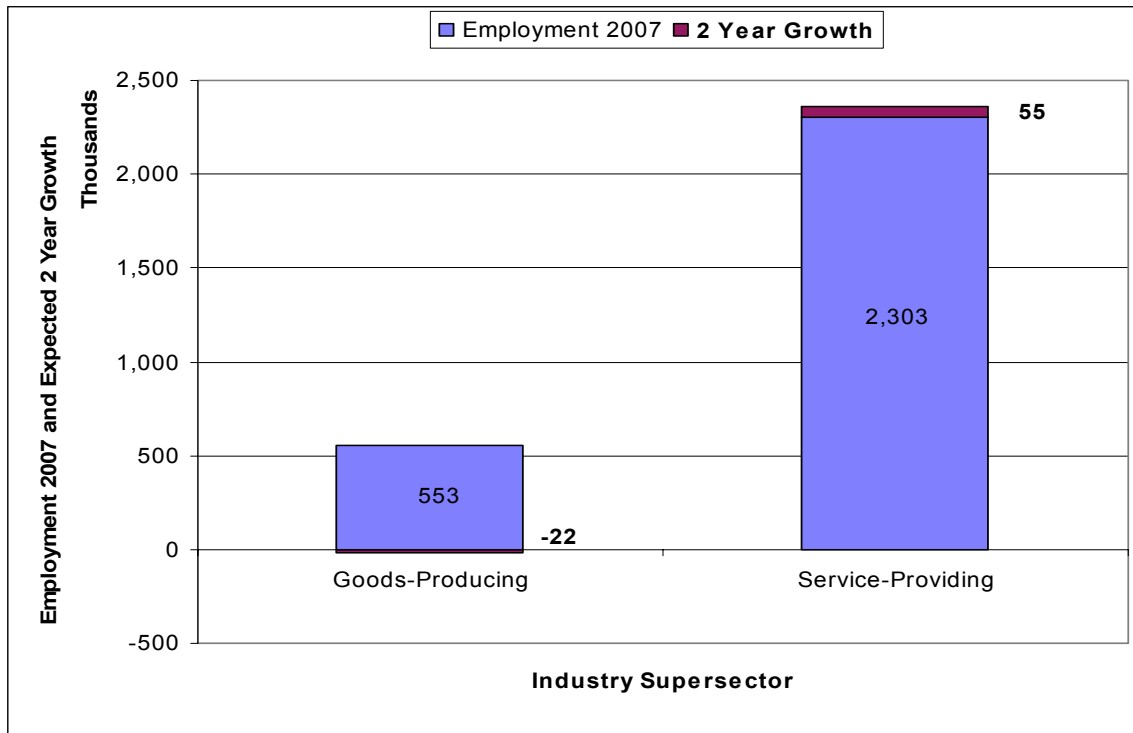


Figure 1. Employment and Growth of Industrial Supersectors in Tennessee, 2007 Quarter 2 to 2009 Quarter 2 (see Table 4, page 11).

² The Federal Trade Commission (2006) provides information on the effect of competition on consumers. The document suggests the myriad ways that openness affects practically every industry. Healthcare and obesity are two instances of the effect of open markets on populations (Federal Trade Commission, 2006).

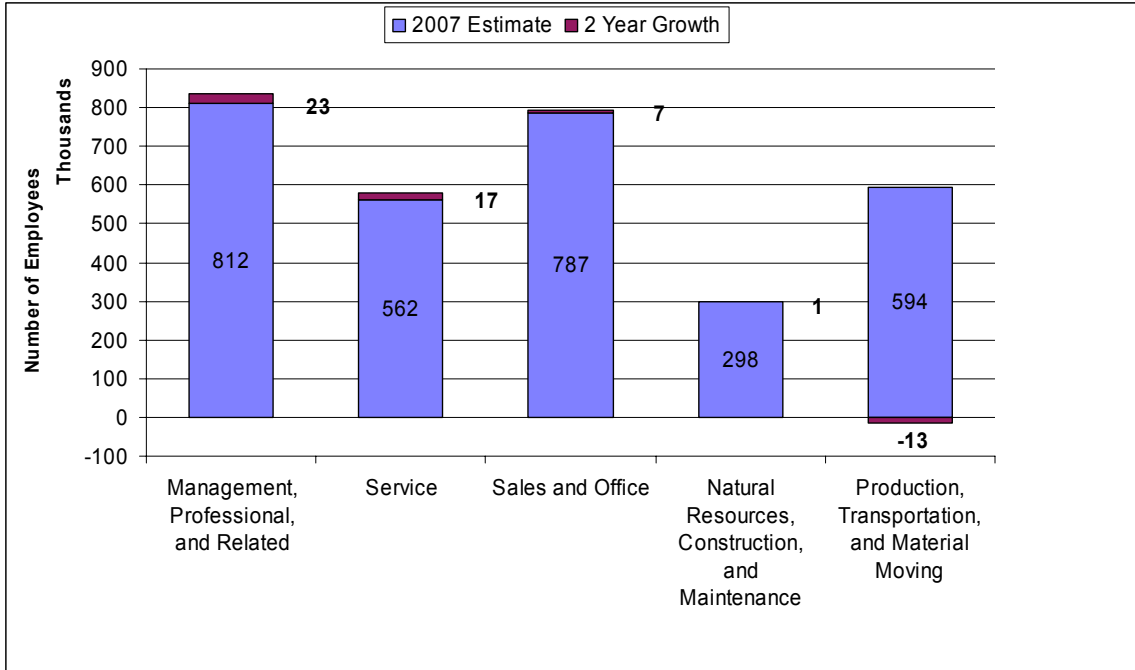


Figure 2. Employment and Growth of Occupational Employment Sectors in Tennessee, 2007 Quarter 2 to 2009 Quarter 2

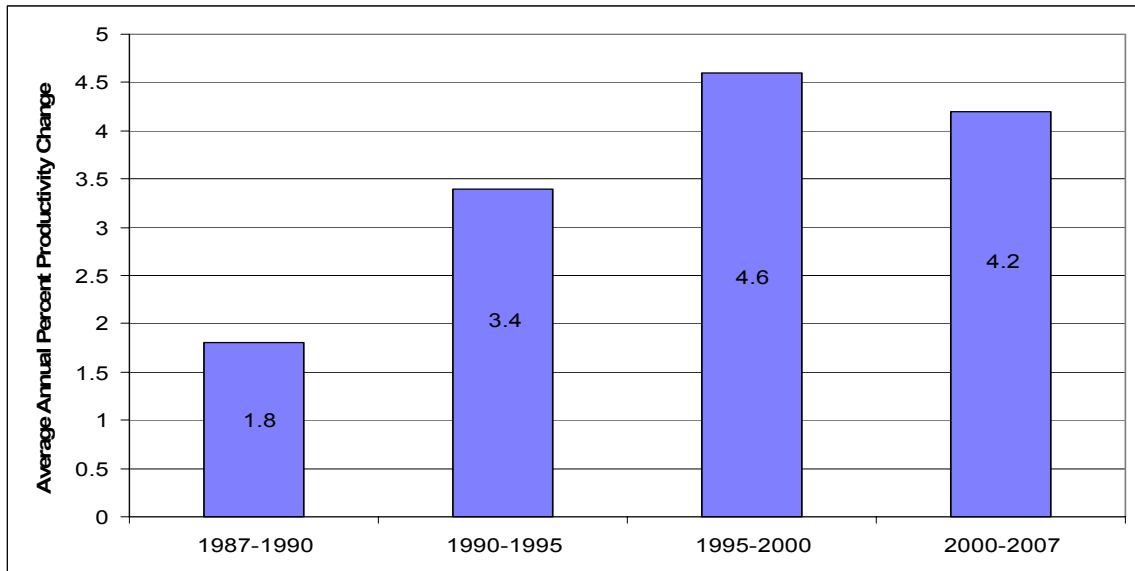


Figure 3. Average Annual Percent Productivity Change³ in US Manufacturing, 1987-2007.

³ Source is <ftp://ftp.bls.gov/pub/special.requests/opt/lpr/mfgbardata.txt>.

Skills and Knowledge Compatible with Service, Health, Science, and Globalization

Today's workforce professionals--assessment, training, and placement staff--want to know the types of skills and knowledge most in demand by today's employers (see Table 6, page 17, for skills; see Table 7, page 18, for knowledge). Rapid growth in the service-providing industries such as health, as well as significant increases in technological knowledge, places the emphasis on skills and knowledge. Globalization emphasizes the need for sharpened social skills. International competition brings linguistic and cultural skills to renewed importance.

Improved training is one response to the greater demands of the marketplace. The most occupational growth is expected to be for those occupations requiring short-term training (Figure 4, page 6), but those jobs requiring a bachelor's degree or more are growing at high rates (Figure 5, page 6). Wages generally increase with the amount of training required, but also vary by the specific industry and occupation of the job. Job seekers may want to invest in training and education to get a boost in salary. The Occupational Information Network (O*Net) provides information on the knowledge, skills, and work activities of occupations.⁴

Housing Slowdown May Suspend Urban Sprawl

Administrative and waste management services are needed as urbanization and urban sprawl coincide with the economic vitality and population growth of the Southern and Western United States.⁵ Tennessee is ranked as the fourth fastest state in land development⁶ using data from the 1997 National Resources Inventory (U. S. Department of Agriculture 2000). The adequate supply of oil had allowed exurban development for at least the short term, but with increased cost per barrel and mortgage crisis, there is likely to be a pause for an indeterminate time. Since housing starts have decisively peaked⁷, expect a pause in continued sprawl.

⁴ The Occupational Information Network (O*NET) contain the skills, knowledge, and work activities for every occupation. Skills forecasting requirements are given by the Employment and Training Administration (ETA). The specific skills needed in your state depend on the skills needed for the occupational needs.

⁵ The Southern and Western United States have the percentage largest population increase as regions from 2005 to 2007. It has 4 of the 10 fastest-growing states, and 5 of the 10 largest growth states. See <http://www.census.gov/popest/states> for tables of regions and states.

⁶ Rank is reported at Internet site <http://www.state.tn.us/tacir/Portal/default.html>. See http://www.nrcs.usda.gov/technical/NRI/1997/summary_report/ on page 77.

⁷ See "The Source" <http://www.sourcetn.org> under "housing starts."

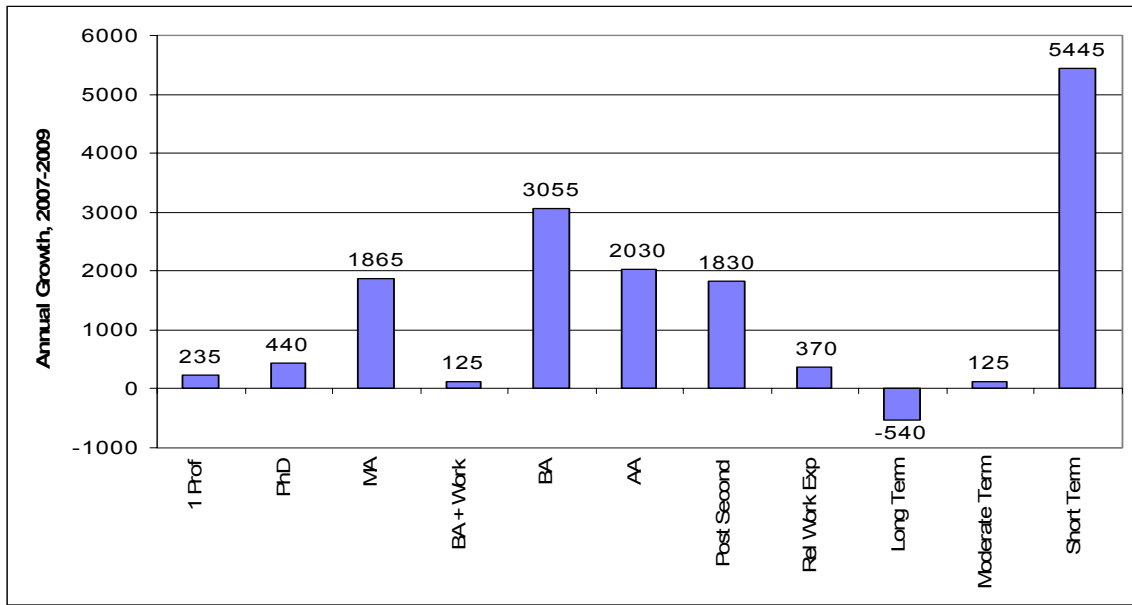


Figure 4. Annual Growth of Employment at Training Levels in Tennessee, 2007-2009

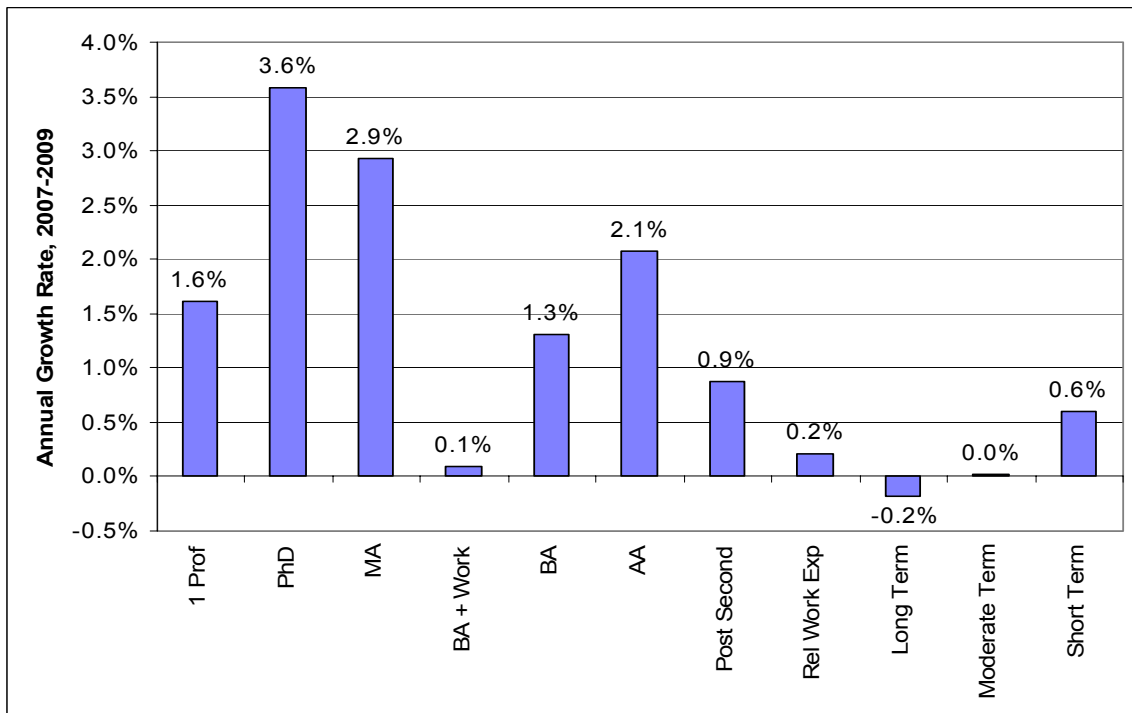


Figure 5. Rate of Growth of Employment at Training Levels in Tennessee, 2007-2009

Occupational Change in Tennessee in 2008 and 2009

Growth rates in major occupational groups (two-digit codes) are led by the community and social services; healthcare support; and education, training, and library occupations, with 3.2, 2.5, and 2.4 percent annual growth (see Table 1, page 8). Healthcare practitioners and technical; personal care and service; food preparation and serving; and arts, design, entertainment, sports, and media are expected to grow at 2.0, 1.8, 1.6, and 1.3 percent respectively.

Several of the most rapidly-growing occupational groups have a large number of jobs (Table 1, page 8). These include education, training, and library occupations (2.4 percent annual growth); healthcare practitioners and technical occupations (2.0 percent); and food preparation (1.6 percent), having hundreds of thousands of jobs and providing varied employment opportunities.

Growth rates in detailed occupations (see Table 2, page 9) are led by the 4.7 percent annual growth in social and human service assistants. Employment of network systems and data communications analysts⁸ is expected to increase 4.0 percent annually. Home health aides are expected to grow at 4.0 percent. Self-enrichment education teachers, graduate teaching assistants, chemistry teachers, and education teachers are expected to grow at 3.9, 3.8, 3.7, and 3.6 percent.

Cashiers have more job openings projected than any other occupation (Table 3, page 10). Following in order of job openings are waiters and waitresses, retail salespersons, laborers and freight movers, customer service representatives, food and serving workers, truck drivers, and registered nurses.

Industrial Change in Tennessee in 2008 and 2009

The next two years show strong industry growth in other services (except government), educational services, and health care and social assistance (Table 4, page 11). Growing industries include arts, entertainment, and recreation, accommodation and food services, management of companies and enterprises, transportation and warehousing, and wholesale trade.

Most of the new jobs projected for industries are service-providing rather than goods-producing. Goods-producing jobs generally have higher pay, and they enliven trade as goods are exported outside the state. Service-providing jobs can make our lives enjoyable and tolerable--these jobs accommodate us, feed us, transport us, and provide care for us (see Table 4, page 11).

⁸ Employment of network systems and data communications personnel has continued to increase throughout the slowdown.

**Table 1. Projections of Major Groups of Occupations,
Tennessee, 2008 and 2009**

SOC	Title	2007 Quarter 2	2009 Quarter 2	Job Growth	Annual Growth Rate
00-0000	Total, All Occupations	3,052,900	3,087,400	34,580	0.6%
21-0000	Community and Social Services Occupations	52,700	56,100	3,430	3.2%
31-0000	Healthcare Support Occupations	70,500	74,000	3,510	2.5%
25-0000	Education, Training, and Library Occupations	154,200	161,600	7,460	2.4%
29-0000	Healthcare Practitioners and Technical Occupations	163,200	169,800	6,640	2.0%
39-0000	Personal Care and Service Occupations	77,300	80,200	2,880	1.8%
35-0000	Food Preparation and Serving Related Occupations	243,800	251,800	7,990	1.6%
27-0000	Arts, Design, Entertainment, Sports, and Media Occupations	44,700	45,900	1,160	1.3%
15-0000	Computer and Mathematical Occupations	40,700	41,600	910	1.1%
23-0000	Legal Occupations	14,900	15,300	320	1.1%
13-0000	Business and Financial Operations Occupations	92,900	94,700	1,830	1.0%
19-0000	Life, Physical, and Social Science Occupations	15,700	16,000	300	0.9%
37-0000	Building and Grounds Cleaning and Maintenance Occupations	109,000	111,000	2,060	0.9%
45-0000	Farming, Fishing, and Forestry Occupations	25,800	26,100	360	0.7%
43-0000	Office and Administrative Support Occupations	490,800	495,200	4,410	0.4%
41-0000	Sales and Related Occupations	296,300	298,800	2,480	0.4%
11-0000	Management Occupations	196,700	198,000	1,320	0.3%
49-0000	Installation, Maintenance, and Repair Occupations	129,400	130,200	740	0.3%
33-0000	Protective Service Occupations	61,700	61,900	160	0.1%
53-0000	Transportation and Material Moving Occupations	276,500	276,900	390	0.1%
47-0000	Construction and Extraction Occupations	142,400	142,500	110	0.0%
17-0000	Architecture and Engineering Occupations	36,400	36,300	-90	-0.1%
51-0000	Production Occupations	317,300	303,500	-13,770	-2.2%

Source: Tennessee Department of Labor and Workforce Development
Employment Security Division, Research and Statistics Section, 3/4/2008

Table 2. Projections of Top 25 Detailed Occupations by Growth Rate, 1500+ Employees with Wages and Training, Tennessee, 2008 and 2009

SOC	Title	Est. 2007 Qtr 2	Proj. 2009 Qtr 2	Ann. Gr. Rate	Median Wage**	TR*
21-1093	Social and Human Service Assistants	20,610	22,570	4.7%	\$23,500	10
15-1081	Network Systems and Data Communications Analysts	2,840	3,070	4.0%	\$56,600	5
31-1011	Home Health Aides	10,920	11,820	4.0%	\$17,700	11
25-3021	Self-Enrichment Education Teachers	2,030	2,190	3.9%	\$31,800	8
25-1191	Graduate Teaching Assistants	2,730	2,940	3.8%	\$15,000	2
25-1052	Chemistry Teachers, Postsecondary	1,580	1,700	3.7%	#N/A	2
25-1081	Education Teachers, Postsecondary	1,820	1,950	3.6%	\$53,100	2
29-2052	Pharmacy Technicians	8,210	8,800	3.6%	\$25,300	6
25-1121	Art, Drama, and Music Teachers, Postsecondary	1,860	2,000	3.6%	\$48,300	2
25-1071	Health Specialties Teachers, Postsecondary	2,180	2,340	3.5%	#N/A	2
31-2021	Physical Therapist Assistants	1,790	1,920	3.5%	\$44,200	6
21-1015	Rehabilitation Counselors	2,230	2,390	3.4%	\$19,300	3
27-2022	Coaches and Scouts	2,740	2,920	3.1%	\$24,500	9
21-1023	Mental Health and Substance Abuse Social Workers	3,320	3,530	3.1%	\$27,000	3
39-9021	Personal and Home Care Aides	13,750	14,620	3.1%	\$17,000	11
21-1014	Mental Health Counselors	2,950	3,140	3.1%	\$27,100	3
31-9092	Medical Assistants	9,500	10,100	3.1%	\$24,000	7
25-1194	Vocational Education Teachers, Postsecondary	1,890	2,010	3.1%	\$40,100	2
25-2041	Special Education Teachers, Preschool, Kindergarten, and Elementary School	4,380	4,640	3.0%	\$38,000	5
27-3031	Public Relations Specialists	2,890	3,060	3.0%	\$39,600	5
39-9041	Residential Advisors	1,950	2,060	2.9%	\$17,700	10
29-1123	Physical Therapists	3,730	3,950	2.9%	\$68,900	3
25-9031	Instructional Coordinators	2,130	2,250	2.8%	\$46,000	3
25-2012	Kindergarten Teachers, Except Special Education	3,790	4,010	2.8%	\$38,700	5
13-1011	Agents and Business Managers of Artists, Performers, and Athletes	2,820	2,970	2.7%	\$62,800	4

*TR (Training): 1: 1 Prof, 2: Ph.D., 3: MA, 4: BA+Work, 5:BA, 6: AA, 7: Post Secondary, 8: Related Work Experience, 9: Long Term Training, 10: Moderate Term, 11: Short Term, **Wages are 2007

Source: Tennessee Department of Labor and Workforce Development
Employment Security Division, Research and Statistics Section, 3/4/2008

Table 3. Projections of Top 25 Detailed Occupations by Number of Total Job Openings, 1500+ Employees, Tennessee, 2008 and 2009

SOC	Title	2007 Qtr 2	2009 Qtr 2	Annual Growth Rate	Total Open ings	Median Annual Wage**	TR
41-2011	Cashiers	75,850	75,770	-0.1%	4,800	\$15,700	11
35-3031	Waiters and Waitresses	51,800	53,450	1.6%	3,900	\$13,600	11
41-2031	Retail Salespersons	85,660	87,170	0.9%	3,690	\$19,500	11
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	72,350	71,370	-0.7%	2,480	\$21,000	11
43-4051	Customer Service Representatives	49,740	51,690	1.9%	2,350	\$26,600	10
35-3021	Combined Food Preparation and Serving Workers, Including Fast Food	59,180	61,680	2.1%	2,230	\$14,300	11
53-3032	Truck Drivers, Heavy and Tractor-Trailer	73,570	75,610	1.4%	2,210	\$35,000	10
29-1111	Registered Nurses	53,820	56,250	2.2%	1,940	\$51,400	6
43-9061	Office Clerks, General	58,960	60,250	1.1%	1,730	\$23,600	11
25-2021	Elementary School Teachers, Except Special Education	30,470	32,090	2.6%	1,410	\$39,300	5
51-2092	Team Assemblers	64,880	62,670	-1.7%	1,280	\$25,400	10
37-2011	Janitors and Cleaners, Except Maids and Housekeeping Cleaner	40,930	41,860	1.1%	1,200	\$17,800	11
21-1093	Social and Human Service Assistants	20,610	22,570	4.7%	1,170	\$23,500	3
11-1021	General and Operations Managers	52,790	52,620	-0.2%	1,160	\$68,200	4
43-5081	Stock Clerks and Order Fillers	40,620	40,350	-0.3%	1,160	\$19,800	11
35-2021	Food Preparation Workers	16,920	17,530	1.8%	1,070	\$17,300	11
35-3022	Counter Attendants, Cafeteria, Food Concession, and Coffee S	8,280	8,480	1.2%	1,040	\$16,600	11
35-9031	Hosts and Hostesses, Restaurant, Lounge, and Coffee Shop	8,600	8,870	1.6%	1,010	\$15,800	11
39-9011	Child Care Workers	25,660	26,030	0.7%	970	\$15,200	11
25-2031	Secondary School Teachers, Except Special and Vocational Education	19,220	19,950	1.9%	940	\$41,500	5
41-1011	First-Line Supervisors/Managers of Retail Sales Workers	39,960	40,220	0.3%	920	\$31,300	8
35-2014	Cooks, Restaurant	18,810	19,420	1.6%	910	\$19,200	9
43-6011	Executive Secretaries and Administrative Assistants	35,460	36,290	1.2%	910	\$31,600	7
29-2061	Licensed Practical and Licensed Vocational Nurses	23,260	23,870	1.3%	900	\$32,100	7
31-1012	Nursing Aides, Orderlies, and Attendants	32,070	33,380	2.0%	890	\$20,300	11

*TR (Training): 1: 1 Prof, 2: Ph.D., 3: MA, 4: BA+Work, 5:BA, 6: AA, 7: Post Secondary, 8: Related Work Experience, 9: Long Term Training, 10: Moderate Term, 11: Short Term, **Wages are 2007.

Source: Tennessee Department of Labor and Workforce Development
Employment Security Division, Research and Statistics Section, 3/4/2008

Table 4. Jobs Gained and Lost with Annual Wages in Thousands for Industry Major Groups, Ranked by Projected Growth Rate, 2008 and 2009

SOC	Industry	Goods/ Service	(Thousands)		#Jobs Gain/ Lost	%Grwth /Year	(Thousands) 2007Q2 Avg. Ann. Wage
			2007 Qtr 2	2009 Qtr 2			
	Total Employment, All Jobs except Self-Employed and Unpaid Family Workers		2855.6	2889.2	33.6	0.6%	\$37.4
	Goods-Producing	G	552.9	531.2	-21.7	-2.0%	\$42.7
	Service-Providing	S	2302.5	2358.0	55.2	1.2%	\$36.2
81	Other Services (Except Government)	S	127.0	133.4	6.4	2.5%	\$26.2
61	Educational Services	S	235.4	246.7	11.3	2.4%	\$39.2
62	Health Care and Social Assistance	S	323.3	338.6	15.2	2.3%	\$40.2
71	Arts, Entertainment, and Recreation	S	33.1	34.4	1.3	1.9%	\$28.8
72	Accommodation and Food Services	S	248.6	256.6	7.9	1.6%	\$14.8
55	Management of Companies and Enterprises	S	24.2	24.9	0.6	1.3%	\$68.7
48	Transportation and Warehousing	S	143.4	146.7	3.3	1.1%	\$45.9
42	Wholesale Trade	S	133.2	136.0	2.8	1.1%	\$53.0
54	Professional, Scientific, and Technical Services	S	108.2	110.1	1.9	0.9%	\$53.4
51	Information	S	49.8	50.5	0.7	0.7%	\$48.0
53	Real Estate and Rental and Leasing	S	36.8	37.3	0.5	0.7%	\$35.4
11	Agriculture, Forestry, Fishing and Hunting	G	33.9	34.2	0.3	0.4%	\$25.8
44	Retail Trade	S	328.6	331.1	2.5	0.4%	\$25.3
23	Construction	G	134.8	135.6	0.8	0.3%	\$38.8
52	Finance and Insurance	S	108.1	108.7	0.6	0.3%	\$57.8
56	Administrative and Support and Waste Management and Remediation	S	187.7	188.0	0.3	0.1%	\$28.3
92	Government	S	211.5	211.5	-0.1	0.0%	\$39.1
22	Utilities	S	3.6	3.5	-0.1	-0.8%	\$60.3
21	Mining	G	3.3	3.1	-0.1	-2.2%	\$49.6
31	Manufacturing	G	380.9	358.3	-22.6	-3.0%	\$45.5

Source: Tennessee Department of Labor and Workforce Development
Employment Security Division, Research and Statistics Section, 3/4/2008

Service-providing industries -- 81 percent of the total employment -- are projected to grow 1.2 percent for 2008 and 2009 (Table 4, page 11). Goods-producing industries are expected to decrease 2.0 percent. Tennessee is likely to lose about 21,700 jobs in the goods-producing industries and gain 55,200 jobs in the service-providing industries, for a net gain of 33,600 jobs.

Employment in mining and manufacturing is very likely to decline (Table 4, page 11). Manufacturing is charted to drop by 3.0 percent annually. Utilities are expected to drop 0.8 percent per year. Government is stable, as is administrative and support and waste management and remediation. Construction as well as finance and insurance are projected to grow slowly. Growth in professional services, information, and real estate are expected to grow more rapidly than the state average.

The growth of service-providing jobs and the decline of goods-producing jobs is a continuing trend; yet the rate of decline of goods-producing employment as is seen clearly in the 2008 to 2009 projections, some say, threatens the entire manufacturing infrastructure. Manufacturing has declined about 20 percent in the last decade, and 16 percent in the last five years.⁹ Historical data indicate that US manufacturing has increased productivity over the past years (Figure 3, page 4). The goods-producing manufacturing industries produce exports to other states and nations. The growing construction industry provides an outlet for many of the products manufactured in the state.

The growth rates of the top 25 industries with 1,500 or more employees, detailed at the three-digit North American Industry Classification System (NAICS) level, are shown in Table 5 (page 14). The top 5 listed by growth rate are religious, grantmaking, civic, professional, and similar organizations (4.9 percent per year); telecommunications (4.5 percent); performing arts and spectator sports (4.0 percent); social assistance (3.4 percent); and sporting goods (3.0). The next 5 are museums and historical sites (2.9 percent), ambulatory health care (2.7 percent), nursing and residential care facilities (2.6 percent), transit and ground passenger transport (2.5 percent), and educational services (2.4 percent).

Wages and Training for 2008 and 2009

The relationship between wages and training is complex (Table 2, page 9; Table 3, page 10; Table 4, page 11). There are some general relationships between job growth, training, and wages for the 2008 and 2009 job period but there are many exceptions.

- Higher paying jobs require more training
- Jobs with higher growth rates have higher wages.
- Jobs with numerous openings have lower pay and require less training.

⁹ See CES (Current Employment Statistics) data in www.state.tn.us/labor-wfd/source.

- Jobs with fringe benefits and rewarding personal environments may have lower salaries. Satisfied workers generally have a good match between pay, effort, and personal interests (Tables 2 and 3).
- Some jobs with lower pay, however, can sometimes be laborious and boring.

Usual training requirements are measured on a scale of 1 to 11, with 1 referring to a first professional degree, 2 to Ph.D., 3 to an MA, 4 to a BA plus work experience, 5 to a BA, 6 to an AA, 7 to a post-secondary degree, 8 to related work experience, 9 to long-term training, 10 to moderate-term training, and 11 to short-term training. The median annual wage from the Occupational Employment and Wages Survey (OES) is provided for each occupation. The median salary is the amount at which half the employees make less, and half make more, than this wage.

The top 25 occupations by growth rate (Table 2, page 9, “TR” column) are led by social and human service assistants, with a growth rate of 4.7 percent, who are required to have moderate term training. Network systems and data communications analysts must have a BA degree. Home health aides can have short-term training.

The higher paying major industry groups include management of companies and enterprises at \$68,700 per year (Table 4, page 11); utilities at \$60,300 per year; finance and insurance at \$57,800 annually; professional, technical, and management at \$53,400 per year; and wholesale trade at \$53,000.

The top 10 occupations by growth rate (Table 2, page 9, “Median Annual Wage” column) are led by social and human service assistants with a wage of \$23,500. Network systems and data communications analysts are at \$56,600. Home health aides are paid \$17,700 per year. Three of the top 10 are paid above \$47,000 per year; in the next 10 none are paid above \$47,000.

Six of these top 10 occupations with a large number of job openings (Table 3, page 10) have wages less than \$25,000 per year, but registered nurses receive wages of \$51,400 on average. General and operations managers are paid \$68,200 per year.

More Training Required for Occupations with High Growth Rates

That more than one-half of the top 25 detailed occupations by growth rate (Table 2, page 9) require a bachelor’s degree or more shows the association of training and education with growth. All but four more of the top 25 require at least an associate’s degree or work experience in a related occupation. Home health aides, personal and home care aides, and residential advisors require either moderate or short-term training. Coaches and scouts require long-term training.

**Table 5. Top 25 Industries Listed by Growth Rate,
1,500 or more Employees, Tennessee, 2008 and 2009**

NAICS	Title	2007Q2			
		2007 Quarter 2	2009 Quarter 2	Annual Growth Rate	Average Annual Wage
813	Religious, Grantmaking, Civic, Professional, and Similar Org	57,666	63,463	4.9%	\$26,416
517	Telecommunications	17,333	18,944	4.5%	\$53,248
711	Performing Arts, Spectator Sports, and Related Industries	9,738	10,529	4.0%	\$59,176
624	Social Assistance	42,433	45,337	3.4%	\$18,668
451	Sporting Goods, Hobby, Book, and Music Stores	11,933	12,671	3.0%	\$17,836
712	Museums, Historical Sites, and Similar Institution	3,292	3,485	2.9%	\$24,752
621	Ambulatory Health Care Services	113,066	119,342	2.7%	\$50,960
623	Nursing and Residential Care Facilities	52,268	54,986	2.6%	\$25,636
485	Transit and Ground Passenger Transport	5,442	5,717	2.5%	\$25,844
611	Educational Services	235,416	246,719	2.4%	\$39,156
444	Building Material and Garden Equipment and Supplies Dealers	30,100	31,493	2.3%	\$29,224
446	Health and Personal Care Stores	23,267	24,202	2.0%	\$31,980
115	Support Activities for Agriculture and Forestry	5,497	5,693	1.8%	\$30,472
523	Securities, Commodity Contracts, and Other Financial Investments	8,578	8,878	1.7%	\$143,832
327	Nonmetallic Mineral Product Manufacturing	15,699	16,210	1.6%	\$43,628
722	Food Services and Drinking Places	211,768	218,611	1.6%	\$13,468
483	Water Transportation	2,270	2,343	1.6%	\$51,740
425	Wholesale Electronic Markets and Agents and Brokers	16,733	17,266	1.6%	\$67,184
452	General Merchandise Stores	71,633	73,872	1.6%	\$21,788
484	Truck Transportation	64,667	66,659	1.5%	\$40,664
721	Accommodation	36,867	37,966	1.5%	\$22,308
622	Hospitals	115,576	118,899	1.4%	\$43,836
551	Management of Companies and Enterprises	24,233	24,871	1.3%	\$68,692
812	Personal and Laundry Services	25,367	26,008	1.3%	\$21,996
910	Total Federal Government Employment	49,971	51,201	1.2%	\$36,816

Source: Tennessee Department of Labor and Workforce Development
Employment Security Division, Research and Statistics Section, 3/4/2008

Less Training Required for Occupations with Large Numbers of Jobs

There are many occupations requiring long-term, moderate-term, or short-term training when occupations are listed by total number of jobs (Table 3, page 10). Over half of the top 25 require short-term training. Customer service representatives, truck drivers (of heavy trucks and tractor-trailers), and team assemblers require moderate-term training. Registered nurses need an associate's degree. General and operations managers require a bachelor's degree plus work experience.

Occupations with large numbers of jobs (Table 3, page 10) generally are paid lower than average wages, but they also require less training. Typical among these jobs is combined food preparation and serving workers, with a \$13,800 median annual salary and requiring short-term training. Jobs that require moderate-term training, however, command a greater salary. Customer service representatives, at \$26,000, are an example.

Some occupations with high pay are listed also among those with a high number of jobs (Table 3, page 10). Registered nurses earn a median annual salary of \$48,900. Secondary school teachers require a bachelor's degree and receive \$41,600. Drivers of heavy trucks and tractor-trailers, with a median salary of \$33,500 and requiring moderate-term training, have relatively good pay for the training required.

Skill and Knowledge Requirements for Jobs Openings in the Long Term

Skill and knowledge needs are shown for total expected openings for 2004-2014 in the tables below.¹⁰ Long-term data are essential to skill and knowledge assessment, since training and educational attainment are multiple year projects.¹¹ Openings reflect immediate needs. Specific skills and knowledge scores for detailed occupations are available on the O*Net (Occupational Information Network).

- *Skills* are abilities needed to accomplish job tasks.
- *Knowledge* is attained by prior training experiences, on-the-job experience, and educational accomplishments.

The importance and ranking of skills and knowledge can inform educators, trainers, and business managers concerning the placement of qualified workers. Skill and

¹⁰ See our paper, "Skill and Knowledge Requirements for Job Openings in Tennessee, 2004-2014.

¹¹ Skill and knowledge needs for the 2014 period are averaged from the O*NET (Occupational Information Network) importance scores using the number of openings. The O*NET project is a multi-year data collection program, with approval from the Office of Management and Budget. Scores range from 1.00 (lowest) to 5.00 (highest). Workers are selected by random sampling in questionnaires asking them to rate the requirements of their own jobs.

knowledge levels are averaged for all openings statewide in Tables 6 and 7 (pages 17 and 18), showing the relative importance of each skill. Skill levels are averaged by growth level. Levels are ordered by their importance with a color scheme.

Results reflect the general need for various skills across occupations and industries. The most needed skills have the higher scores, and are likely to be important across a variety of industries and occupations. Skills with lower scores are likely affiliated with declining occupations, or they may be specific—very important to some occupations but relatively unneeded in others.

Skill and knowledge needs are general to the workforce and sometimes specific to given occupations. The greatest needs can be widespread across occupations, rather than in specific high growth occupations. Some needs are inherent to top job growth occupations. Table 1 (page 8) shows the major occupations with job growth and growth rate, suggesting the kinds of skills and knowledge needed. Table 4 (page 11) contains the major industry groups. The greatest skill and knowledge requirements are likely to relate to the leading groups of occupations and industries which include services, education, and health care and social assistance.

Skill Needs

High Importance. The average skill scores for various characteristics are shown in Table 6 (page 17). Active listening and reading comprehension are the highest in importance. Speaking, time management, critical thinking, active learning, and writing are of high importance in the occupations growing at above average rates. These skills are most important in the emerging service industries (Table 4, page 11). Other skills are needed in such industries as education and healthcare.

- Skill needs are great for active listening, at all growth levels, but especially at growth rates of 1.5 percent or better.
- Reading comprehension and speaking are a great need in occupations growing at 1.5 percent (the state average) or greater.
- Time management, critical thinking, active learning, coordination, and writing are needed at all the highest growth levels.

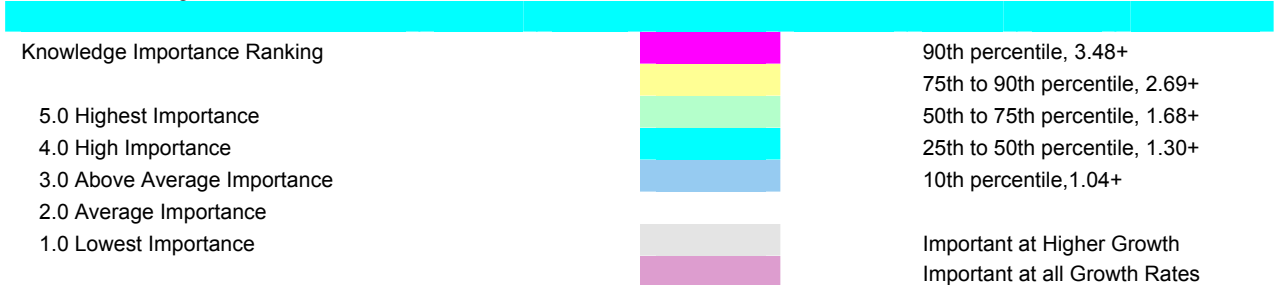
Average Importance. Skills of above average importance include time management, critical thinking, instructing, active learning, social perceptiveness, learning strategies, coordination, service orientation, writing, monitoring, judgment and decision making, and mathematics. The need for these skills is in direct relation to the growth rate of the occupations, with the exception of mathematics, which is especially needed in jobs with low growth levels.

Table 6. Average Skills Scores by Growth Rate for Total Job Openings, Tennessee, 2004-2014
Average Scores for Skills

Skill	All Growth Rates	Growth Rate of Occupation					Correlation of Skills with Growth
		-0.5% or Less	About 0%	About 1%	About 2%	2.5% or More	
Active Listening	4.09	3.76	3.90	3.84	4.20	4.29	0.93
Reading Comprehension	3.75	3.46	3.57	3.70	3.81	4.14	0.97
Speaking	3.74	3.49	3.46	3.50	3.91	3.87	0.85
Time Management	3.46	3.05	3.24	3.44	3.56	3.79	1.00
Critical Thinking	3.46	3.05	3.29	3.18	3.54	3.82	0.92
Instructing	3.41	3.11	3.30	3.24	3.48	3.61	0.94
Active Learning	3.37	3.13	3.21	3.20	3.41	3.83	0.89
Social Perceptiveness	3.35	2.98	3.12	3.03	3.49	3.57	0.90
Learning Strategies	3.32	3.08	3.26	3.17	3.35	3.56	0.90
Coordination	3.32	3.12	3.17	3.08	3.38	3.68	0.84
Service Orientation	3.24	2.87	3.03	2.95	3.36	3.47	0.91
Writing	3.23	2.77	2.99	2.97	3.36	3.63	0.96
Monitoring	3.20	2.88	3.01	3.04	3.29	3.50	0.97
Judgment and Decision Making	3.18	2.80	3.00	2.85	3.27	3.52	0.89
Mathematics	3.17	3.19	3.22	2.79	3.21	2.96	-0.39
Complex Problem Solving	2.82	2.43	2.61	2.66	2.89	3.37	0.94
Negotiation	2.77	2.48	2.56	2.45	2.90	2.95	0.85
Persuasion	2.75	2.16	2.45	2.52	2.91	3.08	0.98
Equipment Selection	2.73	2.44	2.73	2.71	2.69	3.05	0.86
Troubleshooting	2.63	2.44	2.62	2.54	2.61	2.95	0.84
Management of Personnel	2.61	2.37	2.45	2.40	2.72	2.67	0.85
Quality Control Analysis	2.45	2.62	2.52	2.68	2.36	2.64	-0.14
Operation and Control	2.45	2.51	2.57	2.51	2.36	2.57	-0.17
Equipment Maintenance	2.43	2.30	2.55	2.38	2.37	2.50	0.33
Operation Monitoring	2.29	2.16	2.41	2.31	2.22	2.39	0.38
Management of Material	2.27	1.88	2.14	2.18	2.33	2.55	0.98
Operations Analysis	2.27	2.00	2.09	2.27	2.32	2.65	0.97
Systems Evaluation	2.25	2.01	2.11	2.11	2.30	2.51	0.95
Systems Analysis	2.21	1.97	2.16	1.97	2.24	2.47	0.83
Management of Financial	2.17	1.93	2.05	1.93	2.23	2.40	0.87
Repairing	2.09	2.07	2.18	2.06	2.03	2.16	0.04
Technology Design	2.08	1.82	2.00	2.02	2.09	2.47	0.91
Installation	2.00	1.84	2.00	1.99	1.97	2.25	0.85
Science	1.96	1.53	1.72	1.77	2.05	2.41	0.96
Programming	1.53	1.41	1.53	1.59	1.49	1.84	0.79
Average, All Categories	2.80	2.55	2.69	2.66	2.85	3.06	0.74
Median, All Categories	2.74	2.44	2.62	2.54	2.80	2.95	
Skills Importance Ranking							
5.0 Highest Importance							90th percentile, 4.13+
4.0 High Importance							75th to 90th percentile, 3.63+
3.0 Average Importance							50th to 75th percentile, 2.92+
2.0 Below Average Importance							25th to 50th percentile, 2.11+
1.0 Lowest Importance							10th percentile, 1.53+
							Important at Higher Growth
							Important at all Growth Rates

Table 7. Average Knowledge Scores by Growth Rate for Total Job Openings, Tennessee, 2004-2014

Knowledge	Average Scores for Knowledge						Correlation of Knowledge with Growth
	All Growth Rates	Growth Rate of Occupation					
		-0.5% or Less	About 0%	About 1%	About 2%	2.5% or More	
Customer and Personal Service	3.57	2.96	3.25	3.34	3.78	3.62	0.91
Foreign Language	3.35	2.78	3.25	3.18	3.41	3.59	0.93
Physics	2.98	2.70	3.05	2.58	3.00	2.85	0.20
Administration and Management	2.89	2.70	2.74	2.65	3.01	2.88	0.68
English Language	2.79	2.24	2.68	2.53	2.88	3.01	0.91
Law and Government	2.69	2.24	2.71	2.40	2.74	2.62	0.58
Clerical	2.59	2.36	2.55	2.70	2.58	2.82	0.87
Engineering and Technology	2.48	2.20	2.40	2.61	2.46	2.93	0.89
Sociology and Anthropology	2.34	1.70	2.04	1.94	2.52	2.65	0.94
Personnel and Human Resources	2.33	1.89	2.18	2.20	2.46	2.26	0.80
Food Production	2.29	2.54	2.40	2.58	2.26	1.88	-0.82
Telecommunications	2.26	1.62	2.06	1.92	2.40	2.53	0.93
Sales and Marketing	2.26	2.19	1.97	2.16	2.47	1.99	0.09
Economics and Accounting	2.13	1.83	2.08	2.01	2.17	2.17	0.86
Mathematics	2.11	1.94	2.24	2.11	2.06	2.01	-0.05
Production and Processing	2.09	1.84	2.26	1.81	2.07	1.85	-0.14
Transportation	2.09	1.72	2.01	2.06	2.12	2.28	0.95
Communications and Media	1.98	1.70	1.93	2.00	1.99	2.23	0.93
Design	1.78	1.58	1.73	1.78	1.78	2.06	0.92
Geography	1.77	1.40	1.55	1.54	1.91	1.91	0.93
Biology	1.77	1.52	1.63	1.75	1.84	1.88	0.99
Building and Construction	1.72	1.63	1.73	1.77	1.68	1.98	0.76
Education and Training	1.71	1.29	1.49	1.49	1.81	2.07	0.96
Therapy and Counseling	1.70	1.26	1.45	1.44	1.81	2.21	0.94
Medicine and Dentistry	1.62	1.40	1.59	1.47	1.65	1.67	0.82
Fine Arts	1.60	1.38	1.59	1.45	1.64	1.55	0.58
Chemistry	1.56	1.34	1.50	1.48	1.59	1.72	0.95
Mechanical	1.55	1.35	1.59	1.39	1.56	1.57	0.58
Computers and Electronics	1.53	1.34	1.41	1.33	1.67	1.23	0.04
Public Safety and Security	1.51	1.21	1.41	1.40	1.56	1.68	0.97
Psychology	1.46	1.13	1.24	1.23	1.58	1.76	0.94
Philosophy and Theology	1.34	1.17	1.28	1.28	1.38	1.43	0.97
History and Archaeology	1.24	1.13	1.20	1.19	1.25	1.36	0.93
Average, All Categories	2.09	1.80	2.01	1.96	2.15	2.19	0.69
Median, All Categories	1.86	1.54	2.24	1.92	2.37	2.22	



Below Average Importance. There are fewer skill needs in complex problem solving, negotiation, persuasion, equipment select, troubleshooting, management of personnel, quality control analysis, operation and control, equipment maintenance, operation monitoring, management of material, operations analysis, systems evaluation, and systems analysis. Some of these are needed relative in low growth occupations, including quality control analysis, operation and control, equipment maintenance, and operation monitoring. Skills of below average importance are however needed in specific occupations.

Lowest Importance. Repairing, technology design, installation, science, and programming are of lowest importance across all occupations. Repairing is needed regardless of occupational growth level.

Knowledge Needs

High Importance Knowledge. The average knowledge scores are shown in Table 7 (page 18). Customer and personal service is highest in importance. Foreign language, physics, administration and management, English, and law and government are highly important. Customer and personal service, as well as skill in English, is most important in those occupations growing at a rate of 1.5 percent or more, which is above the average growth rate of occupations in the state.

- Knowledge needs are great in customer and personal service, at all growth levels, but especially at growth rates of 1.5 percent or better.
- Foreign language is a great need especially in occupations growing at 2.5 percent or higher.

Above Average Importance. Knowledge of above average importance to job openings includes clerical, engineering and technology, sociology and anthropology, personnel and human resources, food production, and telecommunications. These are more needed in direct relationship to the growth rate of the occupations, with food production as the exception, which has knowledge needs in a declining manufacturing industry.

- Physics, administration and management, English language, and law and government are needed at all growth levels.
- Clerical and engineering and technology have importance to occupations growing at 2.5 percent or more.

Average Importance. Knowledge in sales and marketing, mathematics, production and processing are needed in occupations with all growth rates. Knowledge needs that tend to increase with growth include economics and accounting, transportation, and communications and media. Design, geography, biology, building and construction, education and training, and therapy and counseling have about average or just above average knowledge needs, but the need for these increases as the occupations grow.

Below Average Importance. There are fewer (widespread) knowledge needs in medicine and dentistry, fine arts, chemistry, mechanical, computers and electronics, public safety and security, psychology, philosophy and theology, and history and archaeology. The various openings are often at a lower knowledge level than the higher training generally associated with these occupations. Computers and electronics knowledge is needed in every growth category.

For More Information

The Internet site www.sourcetn.org, “The Source,” contains detailed information on employment for Tennessee. To supplement the information referred to above, wage, training and education, and skills information exists for industries and occupations. Many of the tables can be downloaded into software spreadsheets.

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Walter W. Robinson, March 26, 2008
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