

Exploring Workforce Skills of Northwest Ohio High School Graduates

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Abstract *This study analyzes workforce competencies at the conclusion of high school graduation. Researchers sampled over 875 graduating seniors from 16 high schools within six counties throughout Northwestern Ohio. Results highlight future career and educational goals of these young people and a self-report of skills based on the SCANS competencies and basic foundation skills. When evaluating Foundation Skills of Personal Qualities, Basic Skills, and Thinking Skills, they indicated highest ratings in Personal Qualities and overall lowest ratings in Basic Skills. A series of five Workforce Competencies were also evaluated, including Using Resources, Using Information, Using Technology, Interpersonal Skills, and Working in Systems. Highest ratings for Competencies were reported in Interpersonal Skills and lowest in Using Resources.*

Theoretical Base

There are dramatic forces of change effecting the type of employment, employment-related skills, and necessary training needed for successful employment (Levy & Murnane, 2006; Partnership for 21st Century Skills, 2003; Secretary's Commission on Achieving Necessary Skills [SCANS], 1991). As we have transitioned from an agricultural and industrial economy to a knowledge economy and now the emerging digital economy, employers are expecting higher level skills from youth (National Collaborative on Workforce and Disability for Youth, 2002, Pearson, 2001).

The forces shaping the future of the United States workforce (Karoly & Panis, 2004) include a gradual decrease in the labor force growth rate as the Baby Boomers retire, acceleration of technological change, increase of economic globalization, increase in the rate of transition to decentralized business models, and the demand for more flexible and knowledge-based employees. Demographic changes will have significant impacts on the labor market. Baby boomers decision to continue employment or seek retirement will affect not only the demand for labor, but the leadership and experience-set employers are looking for. Job skill requirements have been changing in all sectors of employment. Technological advances have progressed to the point that more routine labor functions are now being replaced by machines. The increased use of computers to generate data has increased the demand for skill sets in problem solving

and data analysis (Karoly & Panis, 2004). According to the Commission on the Skills of the American Workforce (2006), many well-paying and routine middle-class jobs are rapidly being automated.

Flatter organizational structures focused on decentralized decision-making and team-focused work will require enhanced communication skills, leadership, and teambuilding skills. Technology will further expand the prevalence of non-traditional work arrangements (telecommuting, working from home, etc.). Employers everywhere have access to a worldwide workforce composed of people that do not have to be physically present to participate in work teams or to contribute to an organization (Commission on the Skills of the American Workforce, 2006). Outsourcing is a current tool used as organizations evaluate steps in the production or service chain to determine most effective methods. There are opportunities for other people or organizations to deliver tailored services to meet specific components of a production chain or service sector. For example, Indian engineers may make \$7,500 compared to \$45,000 for a comparable American engineer (National Assoc for Education and the Economy, 2006). The demand for a more adaptable and flexible staff will increase the percentage of workers in non-traditional work arrangements such as contract or consultant work or short-term employment assignments (Karoly & Panis, 2004). Today's employers demand a more skilled employee. In the U.S., less than 20% of the workforce is in jobs classified as unskilled (Lynch, 2000).

Skills Gap

A study conducted by the National Association of Manufacturers and Deloitte Consulting (2005) found that today's skill shortages are broad-based and deep, impacting more than 80% of companies surveyed. The deficiency of available skilled labor has impacted production and productivity and the ability of these manufacturers to meet customer demands. 90% of manufacturing companies indicated a moderate to severe shortage of qualified skilled production employees (front-line workers, machinists, technicians, etc.). Engineers and scientists are also needed with 65% of manufacturers indicating a lack of supply of these educated and skilled employees. Not only are the expected high levels of retirements of skilled baby boomer employees going to impact skilled labor availability but the upcoming availability of skilled trained employees is not anticipated to meet demand. Manufacturing employers cite dissatisfaction with K-12 education systems in terms of their ability to effectively train future employees. When asked whether K-12 schools are doing a good job preparing students for the workplace, 84% of the respondents indicated "no" (NAM & Deloitte, 2005). They also are frustrated by the decline in the number of people seeking advanced training and post-secondary degrees in science and engineering. NAM and Deloitte (2005) found that 74% of manufacturing industry respondents in their study indicated that having a "high performance workforce" will be key to their business success. Not only are manufacturers concerned about technical skills in the labor market, but they also identify ability to work in teams, computer skills, literacy, and supervisory and management skills as essential to future success. Toepfer (1997) suggests that educational systems will need to adapt to new employment realities. The jobs that youth are preparing for today may not be created, the technological advancement has been so rapid that entire career fields are being created and/or eliminated. Workers will be required to learn the skills that evolving opportunities will require and the educational system must adapt to meet changing needs of students (Toepfer, 1997). Involvement of all components of the community are necessary to develop school and community programs to deal with the development of work-related competencies and skills needed in the communities, particularly those in rural areas.

Manufacturing companies not only are concerned about the impending impact of a shortage in skilled labor, many are implementing processes to try to minimize its impact on productivity and business success. 73% of manufacturers in the NAM and Deloitte study conducted in 2005 were implementing training for their employees due to business necessity. Innovative and competitive recruitment strategies, implementing more employee-friendly work environments (flexible schedules, tuition reimbursements, etc.), and utilizing more temporary employment are methods used to expand the available skill base for employers.

Ferry (2003) conducted a study of employment related needs in rural central Pennsylvania. Major employers reported that employees lacked basic communication, problem solving, and team working skills to perform effectively in their worksites. In addition, these employers indicated that computer skills as essential to future success in their business operations. Similar to western Ohio, rural Central Pennsylvania employers reported that they are challenged to be competitive within a global marketplace. Rural central Pennsylvania's economy is transitioning from being agriculture and manufacturing-based to a service-based economy (Ferry, 2003). Technology is a major factor changing rural jobs in the area and is creating new skill set demands for rural employers. Employers in this study indicated that they were having difficulty with turnover in entry-level, low-skilled positions that tend to have low pay. There is significant impact on individuals, communities, and entire regions when employers are not able to secure employees with the right skills to meet their needs (ASTD, 2006; Levy & Murnane, 2006). Employment opportunities in the traditional, high paying

manufacturing industries, such as automotive manufacturing, are disappearing (Levy & Murnane, 2006). Future job growth is expected to be concentrated in higher-skilled occupations, which will result in economic discrepancies between those with higher-level skills and those without (Levy and Murnane, 2006).

The tremendous increase in technological change, higher skill levels required by employers, reallocation of labor globally with manufacturing moving abroad, underemployment, downsizing, and other considerable employment changes have resulted in an uncertain labor market for 16-24 year-old young people (Sum, Fogg, & Magnum, 2000). School-based preparation can provide the experiences and education to prepare young people to make effective decisions about postsecondary education and prepare them to transition from school to employment. A young person is "work ready" when they can effectively make educational and vocational decisions and perform expectations from schools and employers (Sarkees-Wircenski & Scott, 1995). According to the Career Institute for Education and Workforce Development (2002), there is a dramatic disconnect between student courses of study or job pursuits and existing job openings and business needs.

Educational systems and communities also can assist youth in their process of establishing an occupational pathway. Young people traditionally determine their pathway, or "job fit" through meaningful work-based learning experiences and an evaluation of their individual goals, values and strengths (Zeldin & Charner, 1996). Youth then rely on mentors, teachers, family members, peers, educational institutions and others to help them evaluate their career options and the steps and skills necessary to reach their occupational goals (Bailey, et al., 2004; Clausen, 1991; Csiksentmihalyi & Schneider, 2000; Hamilton & Hamilton, 1997). Career development, for most people, is a lifelong process of learning through a step-wise process of involvement in the world of work (Ferry, 2006). Ferry (2006), evaluated rural youth in Pennsylvania and reported the significant role family and community play in the educational and career choices of youth. Each individual undertaking the process is influenced by many factors, including the context in which they live, their personal aptitudes, and educational attainment (Bandura, Barbaranelli, Caprara, & Pastorelli, 2001). The social support and guidance of mentors and adult supervisors has been found to be significantly correlated to a young person's future work-orientation and motivation towards building skills and seeking advanced education to achieve occupational goals (Bennett, 2007).

More than half of our young people leave school without the knowledge or foundation required to find and hold a good job (SCANS 1991, p. xv). According to the US Department of Labor Secretary's Commission on Achieving Necessary Skills (SCANS Report, 1990), the demands for the current workforce require adaptability and the ability to learn and work in teams.

According to Casner-Lotto, J., & Barrington, L. (2006), young people are inadequately prepared to be successful in the workplace. After completing high school, over one-half of those directly entering the world of work are deficient in the most important skills: Oral and Written Communication, Professionalism/Work Ethic, and Critical Thinking/Problem Solving.

College graduates are better prepared, with lower levels of deficiency in the most important skills, but most are not mastering these skills. Only about one-quarter of four-year college graduates are perceived to be excellent in many of the most important skills (Casner-Lotto, J., & Barrington, L., 2006).

The SCANS report focused on three conclusions addressing what work requires of schools: 1) All American high school students must develop a new set of competencies and foundation skills if they are to enjoy a productive, full, and satisfying life; 2) The qualities of high performance that today characterize our most competitive companies must become the standard for the vast majority of our companies, large and small, local, and global; 3) The nation's schools must be transformed into high-performance organizations in their own right.

The SCANS report (1990) identified five competencies and a three-part foundation of skills and personal qualities that are needed for solid job performance. Competencies included: Resources, Interpersonal Skills, Information, Systems, and Technology. Resources were defined as allocating time, money, materials, space and staff. Components of interpersonal skills included working on teams, teaching others, serving customers, leading, negotiating, and working well with people from culturally diverse backgrounds. "Information Know-How" would encompass acquiring and evaluating data, organizing and maintaining files, interpreting and communicating, and using computers to process information. Understanding social, organizational, and technological systems, monitoring and correcting performance, and designing or improving systems are components of systems competency. Technological competency would describe workers who can effectively select equipment and tools, apply technology to specific tasks, and maintain and troubleshoot technologies.

Three foundation competencies were also identified by the SCANS report (1990) including Basic Skills, Thinking Skills, and Personal Qualities. Competence in basic skills would include reading, writing, arithmetic and mathematics, speaking and listening. Thinking skills would comprise thinking creatively, making decisions, solving problems, seeing

things in the mind's eye, knowing how to learn, and reasoning. Individual responsibility, self-esteem, sociability, self management, and integrity defined Personal Qualities in the SCANS report.

According to SCANS (1990), these competencies differ from a person's technical knowledge. The report suggests that classroom instruction must help students apply what they are learning to real-world situations. Students need an opportunity to recognize and solve problems (SCAN Report, 1990). SCANS also developed a "level of competence" to describe the varying proficiency levels ranging from "Preparatory" to "Specialist." (SCANS, 1990).

Cotton (2007) groups employability traits into basic skills, higher-order thinking skills, and affective skills and traits. Basic skills are comprised of oral communication, reading and following directions, basic arithmetic, and writing. Problem solving, learning skills, creative thinking, and decision-making skills comprised higher-order thinking skills. Affective skills and traits focus on attributes such as responsibility, positive attitude, cooperation, honesty, self-discipline, flexibility, and self-confidence.

Research Objectives

The objectives of this research study were to analyze the workforce skills of high school graduates in Northwest Ohio, based on SCANS (Secretary of US Department of Labor Commission on Achieving Necessary Skills, 1990).

Specific components included:

- How do youth evaluate their 3 Foundation Skills
 - Personal Qualities (Integrity/Honesty, Self-Esteem, Sociability, Responsibility, and Self Management)
 - Basic Skills (Listening, Reading, Writing, and Math)
 - Thinking Skills (Problem-Solving, Decision-Making, and Reasoning)
- How do youth evaluate their Workforce Competencies
 - Using Resources (Time, Materials, Human Resources, Money)
 - Using Information (Computers, Organizational, Interpreting Information, and Reasoning)
 - Technology (Selects, Applies, Maintain, and Troubleshoot)
 - Interpersonal Skills (Team-Work, Teaching, Customer Service, Negotiation, and Working with Diverse Audiences)
 - Managing Systems (Performance in Systems, Improve Systems, Design Systems)
- How do youth evaluate the impact of formal educational coursework, volunteering, paid employment, and extracurricular activity involvement as contributing factors to foundation and competency workforce skill development?

Methods

This descriptive and correlation study was conducted in spring of 2008 to assess workforce competencies of graduating high school youth in Northwestern Ohio. Sixteen high schools were identified in six study counties (Mercer, Van Wert, Williams, Henry, Putnam, and Paulding). After receiving approval from Wright State University Human Subjects Review and Ohio State University Human Subjects Review, a written survey instrument was administered in 16 cooperating Northwestern Ohio High Schools with 875 high school seniors providing usable instruments for this research project. Anonymity and confidentiality of participants and their individual responses were maintained throughout the project.

Data analysis using SPSS was utilized to evaluate multiple components of the research. Descriptive statistics analyzed overall youth ratings of workforce skill developments and contributing factors to skill development. Cronbachs alpha of .90 indicates a high level of confidence in instrument validity.

Results

Demographic Data

This sample of students from 16 cooperating school districts in six Northwestern Ohio Counties (Williams, Henry, Paulding, Putnam, Van Wert, and Mercer) is comprised of 875 high school seniors (as of May 2008). Approximately 52%

of the sample was female. A large number of their parents were employed in the management/professional, manufacturing, and skilled trades as professions. A relatively low percentage of the parents of these high school seniors had completed Bachelors or Graduate Degrees (approximately 22% of mothers and 17.5% of fathers).

The majority of respondents indicated that their parents were originally from Northwest Ohio with over 80% of both parents being from the area. The vast majority of these Northwest Ohio High School Seniors were employed at-least part-time. Over 59% of these seniors indicated that they were working 11 hours or more per week. At the end of their high school programs, most reported that they were not allocating a large amount of time studying per week. Over 84% of high school seniors indicated that they were allocating two or less hours per week studying. More than half of the respondents indicated that they were actively engaged in volunteer work on a weekly basis. A sizable number (9.4%) were volunteering more than five hours per week.

High School Seniors reported relative success in their academic work (when analyzing High School Grade Point Average).

To assess SCANS (1991) "Foundation Skills", a series of Likert-Based Questions were asked evaluating youth perceptions of their skills on a series of subcomponents. The instrument was anchored with 1=Strongly Disagree, 5=Strongly Agree. Self-reporting by youth generally reported strong skills. Groups of questions or sub-skills assessed each of the three major Foundation Skills. In table 1, the three "Foundation Skills" are identified as Person Qualities, Thinking Skills, and Basic Skills. The first "Foundation Skill"; Personal Qualities, had the highest overall mean (4.26) when compared to the other two skill sets. High school seniors tended to have more self reported competency in this area. Of some concern, high school seniors indicated the lowest competency in the area of Basic Skills. These Basic Skills include reading, writing and mathematics, speaking and listening.

Table 1. Overall Foundation Skill Means

Foundation Skills	Average Mean
Personal Qualities	4.26
Thinking Skills	4.00
Basic Skills	3.97

Each of the three Foundation Skills can be further analyzed by the respective sub-competencies or components. "Personal Qualities" was evaluated using the following identified components: "Integrity", "Sociability", "Responsibility", "Self Management." and "Self Esteem." Students self reported their competency in each of these components. Generally high school students tended to rate the component of "Integrity" the highest of all competencies among high school seniors with a mean of 4.40 (table 2).

Table 2. Foundation Skills: Personal Qualities

Components	Mean
Integrity	4.40
Sociability	4.30
Responsibility	4.28
Self Management	4.17
Self Esteem	4.13

In evaluating "Basic Skills", five components were evaluated including: "Listening", "Reading", "Speaking", "Writing", and "Mathematics." Table 3 shows High School seniors self-reported low levels of competency in these components compared with the others measured. Of all the competencies within all the Foundation Skills, "Mathematics" was identified as having the lowest mean (3.77). "Writing" (3.88) was also a component that high school seniors indicated was not a strong competency for them.

Table 3 Foundation Skill: Basic Skills

Components	Mean
Listening	4.13
Reading	4.02

Speaking	3.99
Writing	3.88
Mathematics	3.71

In evaluating "Thinking Skills", six components were evaluated including: "Creative Thinking", "Seeing things in the Minds Eye", "Problem Solving", "Decision Making", "How to Learn", and "Reasoning." As indicated in table 4, High school seniors indicated the highest level of competency in "Creative Thinking" with a mean of 4.05. The weakest area within this set of components is "Reasoning" with a mean of 3.90.

Table 4 .Foundation Skill: Thinking Skills

Components	Mean
Creative Thinking	4.05
Seeing in Mind's Eye	4.04
Problem Solving	4.03
Decision Making	4.02
How to Learn	3.95
Reasoning	3.90

Workforce Competencies

To assess "Workforce Competencies", a series of Likert-Based Questions were asked evaluating youth perceptions of their skills on a series of subcomponents. The instrument was anchored with 1=Strongly Disagree, 5=Strongly Agree. Self-reporting by youth generally reported strong skills. The research analyzed youth workforce competencies of: Managing/Using Resources, Managing/Using Information, Managing/Using Technology, Managing and Using Systems, and Interpersonal Skills. Groups of questions or sub-skills assessed each of the five Major Workforce Competencies. Youth reported highest overall skills in "Interpersonal Skills" at 4.10 (Table 5.). Lowest workforce competency ratings were reported in their ability to "Manage and Use Technology", with a mean of 3.61 (table 5).

Table 5 Workforce Competency Comparison

Components	Mean
Interpersonal Skills	4.10
Managing/Using Resources	3.93
Managing/Using Systems	3.83
Managing/Using Information	3.83
Managing/Use Technology	3.61

Each of the five Workforce Competencies can be further analyzed by the respective sub-competencies or components. , "Managing and Using Resources" was evaluated using the following identified components: "Managing Time", "Managing Materials", "Allocating Human Resources", and "Managing Money." As reported in Table 6, youth report strong overall skills in "Managing and Using Resources." They feel strongest about their skills in "Managing Money", with a mean of 4.12. They report weakest skills in "Managing Money" with a mean of 3.69.

Table 6 Workforce Competency: Managing/Using Resources

Components	Mean
Manage Time	4.12
Manage Materials	4.02
Allocate Human Resources	3.87
Manage Money	3.69

In evaluating "Managing and Using Information", four components were evaluated including: "Computer Processes", "Organize Information", "Interpret Information, and "Research Information." Highest mean responses for these four components were reported in "Computer Processes (4.01), with lowest ratings from "Research Information (3.71), (Table 7).

Table 7 Workforce Competency: Managing/Using Information

Components	Mean
Computer Process	4.01
Organize Information	3.81
Interpret Information	3.78
Research Information	3.71

The third competency evaluated was "Managing and Using Technology." This competency included the areas that youth reported their overall lowest skills and abilities. Three components including "Selecting Technology", "Applying Technology", and "Maintaining Technology" were included. The mean response on "Selecting Technology" was 3.73, with a score of 3.66 for "Applying Technology" and 3.45 for "Maintaining Technology" (table 8).

Table 8 Workforce Competency: Managing/Using Technology

Components	Mean
Select Technology	3.73
Apply Technology	3.66
Maintain Technology	3.45

"Participating on Teams", "Cultural Diversity", "Teaching Others", "Serving Customers", "Exercising Leadership", and "Negotiating Decisions" are the six components of "Interpersonal Skills." Overall ratings for this skill set were high (Table 9), with highest mean ratings for "Participate on Teams" (4.27) and lowest for "Negotiate Decisions" (3.91).

Table 9 Workforce Competency: Interpersonal Skills

Components	Mean
Participate on Teams	4.27
Cultural Diversity	4.16
Teach Others	4.16
Serve Customers	4.12
Exercise Leadership	3.99
Negotiate Decisions	3.91

The skill of "Managing and Using Systems" was evaluated with three components of "Monitoring Performance", "Understanding Systems", and "Improving Systems." The mean rating for "Monitor Performance" was 3.95, "Understanding Systems" was rated at 3.83, and "Improving Systems" was the lowest component in this category with a mean of 3.72 (Table 10).

Table 10. Workforce Competency: Managing/Using Systems

Components	Mean
Monitor Performance	3.95
Understand Systems	3.83
Improve Systems	3.72

The researchers asked youth to report the overall contribution or influence that formal education, employment, volunteering, and youth activities had upon the development of workforce skills and competencies. Each respective component was rated with Likert-based Scale of 1-5, with 1= "Very Low Influence" and 5= "Very Strong Influence." Youth who were not involved in the respective activity did not rate that component (i.e. Honor Society). The highest influence on workforce skill and competency development, as reported by graduating high school students, was "Job Influence" at 4.28 (Table 11). The other sources evaluated included "Honor Society", "Course Influence", "4-H", "Service Clubs", "Volunteer Influence", and "Student Government Involvement."

Table 11. Source Competencies and Skills

GPA	Mean
Job Influence	4.28
Honor Society	4.03
Course Influence	3.90
4-H	3.74
Service Clubs	3.73
Volunteer Influence	3.54
Student Government	3.36

Conclusions

The research results revealed interesting and disconcerting trends about the workforce competencies our high school graduating youth self report. A point of interest when analyzing these trends is to note that girls consistently outscored boys in all levels of the SCANS competencies and foundations with the exception of Technology Skills. Also of interest, as GPA rises, so does the skill level of the competencies and foundations. In other words, the higher the GPA the better prepared they are to enter the work force. High school students tended to rate themselves much higher in personal qualities than they did in many of the other workforce competency areas. It appears that they are more confident in their levels of integrity, sociability and responsibility.

One trend that caused some concern was how low high school graduates rated their ability in basic skills such as speaking, writing and mathematics. It was as surprise to see the lack of confidence the students had in these skills especially since K-12 school curriculum places emphasis on these primary learning subjects. Furthermore, students self reported a low competency in managing money. The combination of low math skills and low money management skills can prove to be a disastrous combination personally and on the job. School curriculum focused on financial literacy needs to be emphasized to both help a student's proficiency in this area and also help foster this skill to be applied on the job.

Another area of concern was how low students self reported their competency in using technology and maintaining technology. Beyond the use of social media platforms (texting, Facebook, MySpace, Twitter and so on), there appears to be a major deficiency in technology application. Given the most recent research indicating a dramatic shift to the increasing use of technology in the workplace, youth need to develop a stronger competency in this area.

Youth are reporting that they have a number of influencers on the development of job-related skills. The school curriculum is one source of development of skill sets related to entry into the workforce. Extra-curricular activities, part-time employment, and volunteer work are all influencers on the development of skills preparing young people for employment. A diverse array of extra-curricular activities and practical experiences gained through hands-on paid and volunteer work are necessary for youth to be prepared to enter work-roles in the future.

The lack of a youthful skilled workforce is an emerging issue that calls for partnerships between key service providers (colleges, high schools, local employers, and local government officials) to develop strategies to address these changing workforce needs and identify ways to narrow the gap between the skill sets our students have when they enter the workforce or post secondary institutions and what employers actually need from them. To accomplish this, these findings can be used as a conduit to lead a series of focus groups within a region to begin discussions with community leaders. The results of these guided discussions can provide a road map for colleges and high schools to uniformly implement strategies that narrow the disconnect between local employment needs and how our educational systems prepare youth for work.

Community organizations and employers can play an important role in training young people to enter the workforce. Assuming that preparing young people for the jobs of tomorrow is solely the responsibility of school system, limits the ability of youth to truly be prepared to be valuable employees tomorrow. The private sector and community organizations can play a vital role contributing to school curriculum as resource people, as an avenue for applied projects incorporated into curriculum, and welcoming students in challenging internship experiences. Employers and community leaders need to take an active role working within the school structure and outside to provide perspective to young people that encourages their understanding of the job skills that they will need in the future as well as developing methods to enable youth to develop skills preparing them for tomorrow.

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