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ABSTRACT

This document summarizes the findings of a technical needs assessment survey completed by 207 New Mexico technical businesses in 2000. The major objective of the survey was to identify the types of technical skills employers needed from workers coming from the community and vocational college level. Research indicates that 62% of businesses have difficulty finding hands-on technical employees who have at least some college education, and 54% anticipate a need for more of this type of employee in the next 5 years. The technical skills sets studied in the survey include 52 specific skills and abilities in five basic areas: (1) communication, teamwork, and problem-solving; (2) workplace quality and compliance; (3) math and measurement abilities; (4) computer skills; and (5) manufacturing and technical skills. Employers indicated whether each of these skills was essential, preferred, or not required of entry-level technicians with only some college. Survey results found that those skills most likely to be reported as essential focus on communication, teamwork, work quality, problem-solving skills, punctuality, safety compliance, responsibility, and basic computer and data entry skills. Includes two figures and a table of the businesses' rankings of skills and abilities within each skill group. (KP)

Technology Advisory Council

New Mexico Technical Business Skills Needs Survey

August 2000

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EXECUTIVE SUMMARY

Background

In August 2000, Research & Polling, an independent public opinion and marketing research company, conducted a technical needs assessment survey with 207 New Mexico technical businesses throughout the state. The survey was conducted for the New Mexico Association of Community Colleges for use in projecting curriculum development needs to serve the New Mexico technology business sector.

The survey was sponsored by a council of prominent technical companies and organizations named the Technology Advisory Council (TAC) which included Intel, Los Alamos National Laboratory, Sandia National Laboratories, Technical Industries Association of New Mexico, Industry Network Corporation, and the New Mexico Association of Community Colleges.

The research objectives, methods, and major results of this survey are described in this Executive Summary. Accompanying the Executive Report are detailed data tables for each survey item, including a demographic subgroup presentation for each survey item. Also delivered to the New Mexico Association of Community Colleges are detailed data tables by New Mexico geographic regions, and type of interviewee (i. e., manufacturing and maintenance personnel).

Research Objectives

The major objective of the TAC survey was to identify from New Mexico technology businesses the types of technical skills needed from employees at the community and vocational college level, excluding Bachelor degree programs. The Santa Fe Association of Community Colleges plans to share the results of this survey with curriculum developers for the purpose of planning appropriate coursework to meet the needs of New Mexico technology businesses. Of special interest to TAC is to identify skill needs by geographic region of New Mexico, and to identify the profiles of various employer audiences for use in marketing activities.

Skill and ability sets studied in the TAC survey focus on five basic areas: 1)Communication, teamwork, and problem-solving; 2) workplace quality and compliance; 3)math and measurement abilities; 4)computer skills; and, 5)manufacturing and technical skills.

Research Methods

The TAC survey was conducted with a sample of technical businesses in New Mexico comprised of the following industries: 1) Biomedical, 2) Communications, 3) Electronics, electrical equipment, and computer service, 4) Engineering, 5) Environmental, 6) Food processing, 7) Information technology, 8) Manufacturers using technology, 9) Optics, 10) Printing, 11) Research and development, and, 12) Utilities.

The contact lists for these industries were developed by Research & Polling with the assistance of various TAC sponsors who provided lists based on the respective industry codes. Research & Polling conducted all contact information research for this industry list to assure that the appropriate hiring officials, or supervisors of 'hands on' manufacturing and maintenance staff were interviewed. 1,025 industries were identified statewide after lists were merged and de-duplicated by Research & Polling.

Research & Polling's pre-testing of the survey indicated that the telephone method yielded superior response rates as compared to facsimile surveys, which were also pre-tested. The telephone method afforded a more proactive approach to encouraging participation and ensuring that TAC's timeline for curriculum development would be met. Nonetheless, up to ten callbacks were sometimes necessary to procure the 207 completed interviews in spite of an incentive of a drawing for an executive pen set and an offer to share survey results with the respondent. Barriers to survey participation were encountered by interviewers, including company policies prohibiting employees from participating in surveys, and a reported lack of time to participate in a relatively lengthy interview.

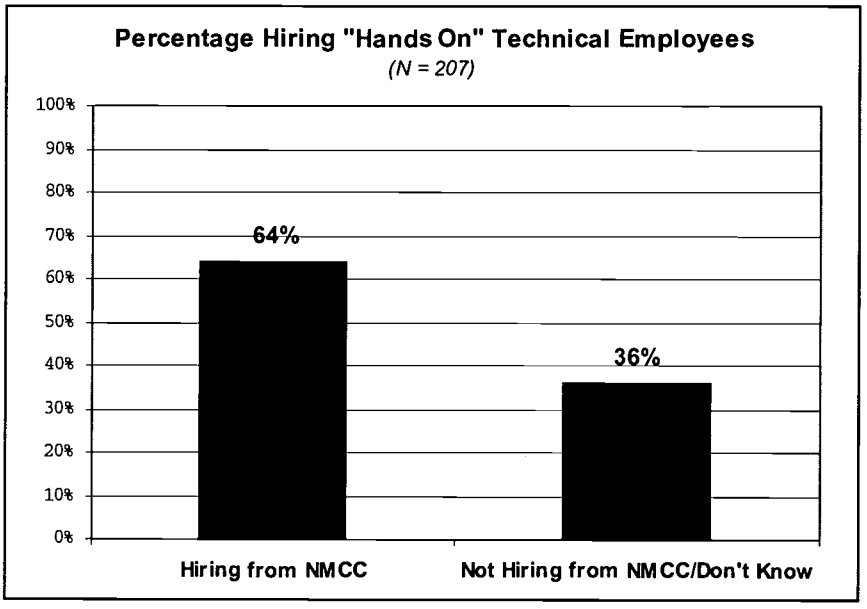
The questionnaire was comprised of 117 items, including ten open-ended questions in which the survey respondent was asked to offer comments in their own words. Other items were comprised of closed-ended questions most of which involved evaluating skill issues on a 3-point rating scale in which the respondent evaluated specific job skills as 'essential,' 'preferred,' or 'not required' of entry-level technicians with only some college.

Research & Polling edited, coded, and analyzed all data so as to permit quantitative analysis of the data. The chi-square test of statistical significance is shown on the data tables presented to TAC, where a probability (p) of 0.05 or less signifies a statistically significant difference among subgroups provided the sample size for each subgroup issue is at least 30. (A series of '+' signs or '-' signs signify which groups are higher or lower than overall or other groups on the data tables). Since many of the TAC survey subgroups are very small, data must be interpreted with caution for such sub-groups. Indeed, some of the sub-group analyses desired by TAC's curricula developers are sometimes comprised of no observations. Such data will obviously be statistically unreliable; however, TAC chose to present such data so as to provide a gauge of skill needs, even if response rates for sub-groups are low.

The overall data presented here in the Research Results section of this Executive Summary is based on 207 observations, which yields more reliable findings.

Research Results

Hiring From the New Mexico Community Colleges For 'Hands On' Technical Employees

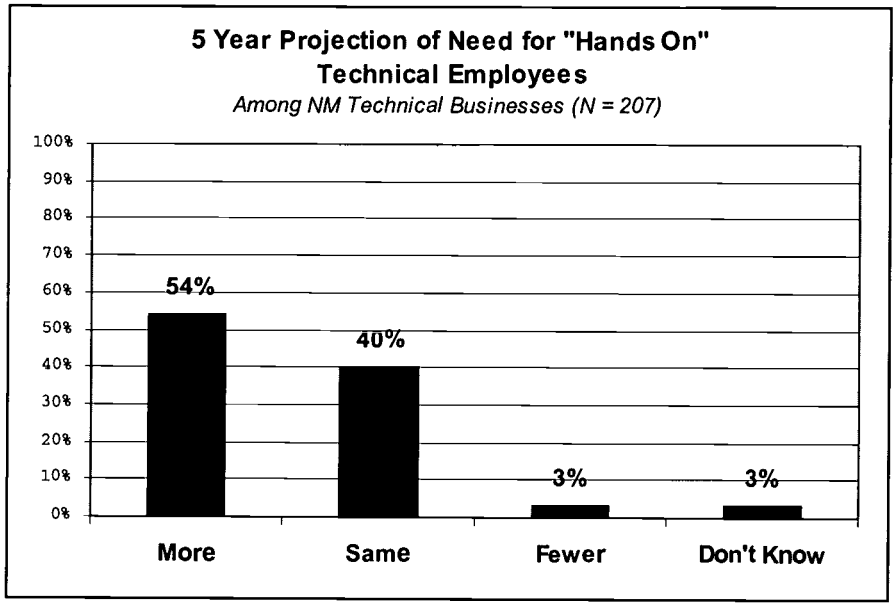


Of interest to the New Mexico Association of Community Colleges is the percentage of New Mexico employers that hire entry-level 'hands on' workers from any of the New Mexico community colleges. As will be noted, 66% of the New Mexico technical businesses interviewed have hired at least one of this type of employee who was trained at one of the New Mexico community colleges. Those schools most frequently mentioned as training sources of 'hands on' technical employees *other* than the community colleges are UNM (the Albuquerque campus) (14%), in-house training (9%), ITT (9%), and NMSU (9%).

Difficulty In Finding Qualified 'Hands On' Technical Employees With Some College

Sixty-two percent of the New Mexico technical businesses report that they have difficulty finding 'hands on' technical employees that have at least some college education. This is particularly the case for the electronics industry (85%), manufacturers using technology (70%), communications and information technology companies (70%), and the optics industry (67%). Also, the greater the number of technicians hired per year, the more likely the company is to report difficulties in locating qualified employees. (The larger the company, the more such employees are hired per year). Of the geographic regions in which sufficient companies were interviewed, the North Central region reports difficulty in finding entry-level 'hands on' technical employees (69%) as does Central New Mexico (60%).

Employer Hiring Projections For 'Hands On' Technical Workers Over Next 5 Years



Noteworthy is that the need by the New Mexico technical businesses for 'hands on' technical workers with some college is anticipated to be more or the same as in 2000 by 94% of those responding to the survey. Since sample sizes for projections are small by industry type, conclusions are only reliable for manufacturers using technology. Sixty-two percent in this sector anticipate that more technical employees will be hired within the next five years. Fifty-eight percent of Central New Mexico employers expect to hire more such employees in five years, and 56% in the North Central corridor anticipate this to be the case. Larger companies, which also tend to hire more employees, tend to be the ones that anticipate a greater need for more entry-level 'hands on' technical employees with some college education over the next five years.

Ranking of All TAC Types of Skills/Abilities Needed and Profiles of Who Is More Likely to Consider Skills/Abilities 'Essential'

Of special interest to TAC is which skills and abilities are evaluated as 'essential' and 'preferred' by the greatest number of employers. Presented here is ranking of the 52 specific skills and abilities evaluated by the TAC survey. Items are ranked by the percentage reporting the skill or ability as 'essential.' When the 'essential' and 'preferred' categories are combined, nearly the same skills and abilities remain in the top ten in the ranking shown in the chart that follows.

Interestingly, those skills most likely to be reported as 'essential' focus on communication, teamwork, focus on common work mission, work quality, problem-solving skills, punctuality, safety compliance, responsibility, and basic computer and data entry skills. The specific work skills are considered to be 'essential' by a more select employer group; thus, the prevalence of the need for these skills is smaller overall and tends to be more focused on particular types of industries.

So as to point out the profiles of the types of companies that are more likely to prefer each of the skills addressed by the TAC survey, these are presented in the far right column of the chart that follows. Also presented are charts profiling the ranking of these skills within the basic skill groups addressed in the survey, which are: 1) Communication, teamwork, and problem-solving, 2) workplace quality and compliance, 3) math and measurement abilities, 4) computer skills, and, 5) manufacturing and technical skills.

Ranking of Skills and Abilities Within Skill Groups

Shown here are the rankings of skills and abilities by 'essential' within basic TAC survey skill groups.

Communication, Teamwork, and Problem Solving Skills

Skill (ranked by percent "essential")	*Essential*	*Preferred*	*Not Required*
Ability to understand verbal instructions	78%	15%	6%
Ability to solve problems	67%	28%	5%
Ability to work in teams	64%	25%	11%
Good verbal communication skills	60%	26%	14%
Ability to focus on common goals	60%	33%	7%
Ability to troubleshoot technical problems	54%	33%	13%
Good customer service skills	53%	27%	21%
Ability to facilitate work projects	37%	49%	14%
Ability to write reports/requests/documents	36%	43%	20%

Workplace Quality and Compliance

Skill (ranked by percent "essential")	*Essential*	*Preferred*	*Not Required*
Commitment to work quality	82%	13%	6%
Compliance with safety practices	77%	14%	10%
Taking responsibility	59%	33%	8%
Punctuality	58%	31%	11%

Math and Measurement Abilities

Skill (ranked by percent "essential")	*Essential*	*Preferred*	*Not Required*
Read dials and meters	52%	22%	27%
Solve for an unknown variable	27%	30%	43%
Calculate right angles	26%	29%	44%
Understand process control charts	25%	38%	37%
Develop process control charts	13%	33%	55%

Computer Skills

Skill (ranked by percent "essential")	*Essential*	*Preferred*	*Not Required*
Basic computer/data entry skills	57%	28%	14%
Use computers as a job specific tool	48%	32%	20%
Use computers for technical applications	43%	39%	18%
Use email	36%	35%	29%
Use of the Internet	26%	33%	41%
Install computer software	21%	25%	54%
Perform system operations/monitor/maintenance	18%	19%	62%
Upgrade computer configuration	17%	23%	60%
Install computer hardware	15%	25%	59%

Manufacturing and Technical Skills

Skill (ranked by percent "essential")	*Essential*	*Preferred*	*Not Required*
Ability to use hand tools	54%	19%	28%
Use and understand measurement instruments	49%	26%	25%
Ability to use power tools	46%	18%	36%
Reading prints and schematics	40%	29%	31%
Understand blueprints	38%	25%	38%
Understand principles of basic electricity	29%	26%	45%
Understand principles industrial materials	20%	31%	49%
Metal fabrication	18%	19%	63%
Understand principles of drafting	16%	25%	59%
Production planning	16%	26%	58%
Understand principles computer networking	15%	30%	55%
Understand principles of digital electronics	13%	25%	62%
Understand principles of laboratory technology	13%	20%	67%
Understand principles of electromechanics	12%	24%	64%
Motor control	12%	18%	71%
Understand principles of digital communications	11%	29%	59%
Optics/fiber optics	11%	13%	76%
Understand principles of hydraulics	10%	16%	73%
Rigging	8%	13%	79%
Semiconductor circuits	8%	17%	75%
Vacuum	8%	14%	78%
Microprocessors	7%	18%	75%
Radio communication	7%	15%	78%
Plastics/composites	6%	15%	79%
Pneumatics	5%	19%	76%

Conclusions

There is considerable opportunity to prepare community college students for entry-level 'hands on' technical positions since New Mexico technical businesses note shortages and anticipate more such employees will be needed five years from now.

In today's marketplace the larger the employer, the greater the need for more technical employees with some college. The New Mexico electronics industry, and the larger sector of manufacturers using technology, are especially prone to reporting difficulty in finding qualified entry-level technical employees with some college education. Shortages by geography are more difficult to pinpoint due to insufficient sample sizes on this level; however, it is clear that the companies located in Central and North Central New Mexico are currently challenged with finding 'hands on' technicians with some college training.

Over one-half of the New Mexico industries interviewed state-wide project that they will need more technical employees with some college five years from now, and another 40% believe that their need for such employees will remain stable over this time period. Again, the larger employers are those that are more likely to project a greater need five years from now than the smaller companies.

In spite of the opportunity to prepare students for these 'hands on' technical positions that require some college, there is presently considerable diversity of where such employees are trained. The survey shows that at least two-thirds of the New Mexico technical employers interviewed report that they have hired at least one employee who was trained by at least one of the twenty New Mexico community colleges. Nonetheless, there is a broad range of schools and in-house training sources for such employees, including not only New Mexico educational institutions outside of the New Mexico community college system, but also out-of-state schools. Those schools outside of the New Mexico community college system most frequently mentioned as the educational institution training such entry-level technicians are UNM, ITT, and NMSU.

At least 9% of the New Mexico technology businesses are conducting their own in-house training of entry-level 'hands on' technical workers at this time. It is suggested that TAC investigate, through more in-depth research, employers' perceptions regarding these institutions and in-house training preferences. There might be opportunity to conduct such information collection as part of a promotional and marketing program administered by the community colleges.

In any case, it is clear that the New Mexico community colleges need to be proactive in curriculum development efforts so as to increase the base of entry-level technical employees available to New Mexico's business technology sector. It is suggested that curriculum developers study the trends of the comprehensive skills list presented in this Executive Summary so as to develop curriculum according to reported need. In particular, it would be beneficial for curriculum developers and community college planners to take note of which employers are prime target audiences for specific employee skills and abilities. This will help determine which curriculum might be developed in which regions, and for types of industrial sectors.

Even though the research methods of this survey expended considerable effort to gain survey participation, it is noteworthy that the response rates, and the resulting data reliability by employer subgroups, remains low. For this reason it is suggested that the profiles be studied, and that this information be expanded through more in-depth information collected in public relations contacts and marketing calls to specific industries by campus recruiters. This personal rapport might help pave the way for making in-roads to assure future use of the community college resources.

A primary marketing point with these industries might be to assure employers that students are being prepared in core areas of common interest to all employers---verbal communication, teamwork, dedication to work quality and responsibility, problem-solving, basic computer skills, and training emphasizing cognizance of the company's policies and safety precautions. Further in-roads might be made by getting to know the particulars of an organization's needs. Clearly, the educational institutions that are most adaptive to the needs of the employer will meet with the greatest success in being selected as a team member in preparing for the human resources for New Mexico's technical business sector.

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