

***Nebraska Rural/Urban* Variations in Business Requirements for Educational Services in Information Technology**

**Comparing Greater Nebraska 2002 Survey and
1999 Greater Omaha Survey Results**

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The Midwest Center for Information Technology

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Executive Summary

In 1999, the Applied Information Management (AIM) Institute completed a major study of Business Requirements for Educational Services in Information Technologies for Greater Omaha firms.

In 2002 AIM, in partnership with ten community colleges across the Midwest, received a grant from the National Science Foundation (NSF) to create the Midwest Center for Information Technology. A requirement of the NSF grant was to evaluate business requirements for educational services in Information Technology across the service areas of these community colleges. The study was completed in the summer of 2002. Among the respondents were 79 Greater Nebraska employers, excluding the Omaha SMA.

The 1999 and 2002 studies provide a unique opportunity to compare rural and urban variations in business requirements for educational services in Information Technology from Nebraska employers. The comparison is between two distinctly different populations:

- 79 employers located in more rural areas with an average of 245 employees.
- 43 urban firms with an average of 1,546 employees.

While three years separate the two surveys, the dynamic impact of changing Information Technologies on business practices remained consistent throughout the period. The results clearly indicate that while economic conditions in 1999 were more robust than in 2002, the only effect was a slower growth in the economy, not a change in the role of IT within the business enterprise.

This study documents both similarities and variations in business requirements for educational services in Information Technology (IT).

Similarities

The similarities are quite significant suggesting that firms of all sizes, no matter their location, are being driven by profound changes in Information Technology. These similarities are:

The Impact of Telecommunications, Networking and E-commerce -

These three Academic Disciplines were ranked very important by both urban and rural employers. In the next five years, the total employment in these three IT professional fields will grow to nearly one-third of all IT professionals for Greater Omaha firms and over 40% for their rural counterparts. This will create a growing demand for educational services in these disciplines.

Training Budgets -

Both urban and rural firms are spending more than four times as much per employee to train their IT professionals than the average for all employees.

Executive Summary

Tuition reimbursement budgets were smaller than all other training budget categories.

Academic Disciplines -

The Academic Disciplines of Networking, Systems Integration and Technology Management were ranked very high by both urban and rural employers.

Applied Areas -

48 different Applied Areas or courses in the various Academic Disciplines were ranked. 13 of the top ranked disciplines were identical for both urban and rural employers. These findings suggest both groups are facing essentially the same challenges as they respond to changing market forces driven by IT.

College Responsiveness -

Neither urban nor rural employers ranked colleges and universities as “meeting their needs” in any high ranked Applied Area. This pattern reflects rapidly changing market requirements for educational services that largely “swamp” the ability of schools to respond with appropriate courses and faculty.

Educational Achievement of Workers -

Over 40% of the IT employees have sub-baccalaureate degrees for both urban and rural employers. Both groups want higher percentages of their employees to hold baccalaureate and graduate degrees in the future. This creates a demand for colleges and universities to produce educational opportunities, while highlighting the need to remove barriers to progressively higher degrees by employees.

Differences

There were also marked differences between urban and rural employers. Those differences included:

The Way Training Budgets Are Spent -

Rural employers are spending about 25% of their training budgets on internal programs, compared to twice that amount by urban employers. This pattern may reflect, in part, the ability of larger firms to have more robust internal training options than smaller firms.

Meanwhile, the rural employers spent over one-third of their training budgets on external seminars and workshops – twice the rate of their urban counterparts. This represents good continuing education opportunities for content providers in rural areas.

Finally, Vendor Certifications commanded a much higher percentage of the rural firms’ training budgets than those of urban employers.

Executive Summary

Firm Size -

The 2002 study had an average firm size of only 245 employees compared to an average of 1,546 for the urban counterparts. This creates substantial differences, particularly for the smallest employers who have greater difficulty in providing the infrastructure to train and support employees. Also, those in the most rural areas are less likely to have robust technical and professional services within their community.

Projected Employment Growth -

Urban employers projected over 20% growth between 1999 and 2004 in both total employment and IT employment. The rural firms projected 10% growth for total employment and 20% for IT employment between 2002 and 2007. For total employment, this difference reflects, in part, the slower economic conditions that existed in the 2002 study, compared to the more robust period in 1999 when the Greater Omaha study was completed. The smallest of the rural firms – those with less than 100 employees, are projecting rapid IT employment growth at 58% over the next five years.

Tuition Reimbursement -

The firms in the rural study had a significantly lower percent of students on tuition reimbursement for both IT employees and all employees. This may reflect slower economic conditions in the 2002 study of rural firms. In addition, many rural areas do not have a postsecondary institution within their community, and this may reduce the demand on rural firms for reimbursement programs.

Introduction

In 1999 the Applied Information Management (AIM) Institute completed a major study of Business Requirements for Educational Services in Information Technology for Greater Omaha firms. The study included information from 43 Greater Omaha employers with total employment of 66,493. Of that total, 5,321 were Information Technology professionals.

The 1999 study documented areas of greatest demand by the business community for IT educational services and noted areas where the academic community could strengthen its offerings. The 1999 study also estimated the size of corporate educational budgets and IT employment. This 1999 study, and a similar study completed in 1995, proved instructive for the education and business community alike. Figure 1 on the following page provides the demographic background of employers and employment in this five county region.

In 2002 AIM, in partnership with ten community colleges across the Midwest, received a grant from the National Science Foundation to create the Midwest Center for Information Technology. Requirements of the grant included measuring and documenting demand for IT education from employers in the areas served by the participating schools. A survey instrument, very similar to the 1995 and 1999 Greater Omaha surveys, was used and the results reported in a study entitled "Midwestern Regional Business Requirements for Educational Services in Information Technology." The respondents included 79 Greater Nebraska employers (excluding the Omaha SMA).

The 2002 Midwest and 1999 Greater Omaha studies provide, for the first time, the opportunity to document differences in IT educational services between urban and rural areas in Nebraska. There are numerous conditions that might suggest different requirements exist, including:

- Greater number of mainframe-based operations in urban areas.
- Greater choice in educational opportunities in urban areas.
- Generally a more robust communications infrastructure (broadband, support facilities, more vendors, etc.) in urban areas.
- Larger pool of technical professionals in urban areas.

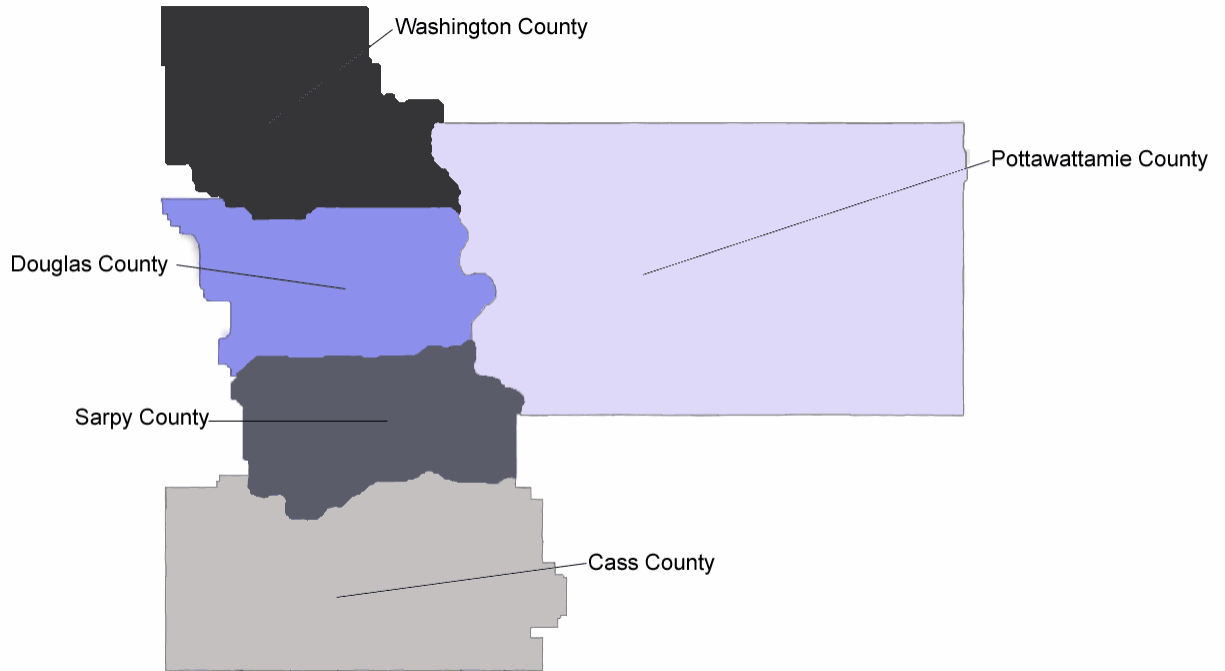
Economic conditions were different between the two survey periods. A robust economy with very tight labor availability existed in 1999, while a weaker economy with somewhat higher unemployment rates prevailed in 2002. The role of IT in the future of business, however, was unchanged. This comparison could be very instructive to rural and urban educational and business institutions alike.

This report documents variations in findings from the Greater Omaha 1999 study and the 2002 Greater Nebraska regional study.

Introduction

Figure 1

Greater Omaha Labor Statistics
Greater Omaha Counties – Cass, Douglas, Pottawattamie, Sarpy, Washington



Greater Omaha Labor Statistics

County, State	Labor Force (May 2002)	Number of Employers* (June 2002)	Number of Employers* 1-99 Employees (June 2002)	Number of Employers* 100+ Employees (June 2002)
Cass County, NE	13,359	827	804	4
Douglas County, NE	267,049	22,048	21,122	578
Pottawattamie County, IA	50,938	3,291	3,143	69
Sarpy County, NE	63,552	3,373	3,257	61
Washington County, NE	11,185	835	786	11
Total Greater Omaha	406,083	30,374	29,112	723

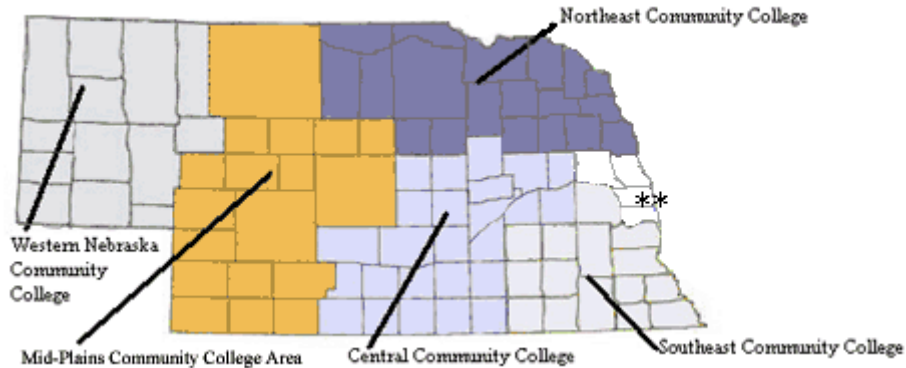
Sources: DirectoriesUSA.com
U.S. Department of Labor, Bureau of Labor Statistics

* Not all employers recorded their employee size.

Introduction

Figure 2

Greater Nebraska Regional Labor Statistics by Community College Service Area



Greater Nebraska Regional Labor Statistics

Community College	Labor Force (May 2002)	Number of Employers* (June 2002)	Number of Employers* 1-99 Employees (June 2002)	Number of Employers* 100+ Employees (June 2002)
Central Community College	168,538	16,900	16,029	209
Mid-Plains Community College Area	50,096	6,582	6,196	35
Northeast Community College	88,212	9,279	8,804	75
Southeast Community College	244,444	21,033	19,182	356
Western Nebraska Community College	48,972	5,827	5,582	43
Total Greater Nebraska Regional	1,606,169	136,933	461,989	1,616

Sources: DirectoriesUSA.com
U.S. Department of Labor, Bureau of Labor Statistics

* Not all employers recorded their employee size.

** Most of the Service Area of Metropolitan Community College is included in the Greater Omaha analysis.

Employment & Training Budgets

A. Employment

The 2002 summary of Greater Nebraska firms included 79 participants with total employment of 17,699. These employers had an average of 224 employees. There were 30 firms with employment of 100 or more (average size 538) and 49 firms with less than 100 employees (average size 37).

The 1999 Greater Omaha survey had only 43 respondents but their total employment was 66,493 or an average of 1,546 employees per firm. That study had 33 employers with 100 or more employees (average size 2001) and 10 small employers with less than 100 employees (average size 44).

SUMMARY STATISTICS 2002 and 1999 Studies All firms		
	Gr. Nebraska <u>2002</u>	Omaha <u>1999</u>
Number of Firms	79	43
Total Employment	17,699	66,493
Average Employment Per Firm	224	1,546

Information Technology employment totaled 548 for the 79 Greater Nebraska firms, while Greater Omaha IT employment in the 1999 study was 7,616. Both Greater Nebraska employers and the Greater Omaha employers were projecting growth; however, the more rural employers projected growth rates of all employees over the next five years at about one-half the growth expected by Omaha employers. For Information Technology employment, projected growth rates for rural and urban employers are similar.

It is somewhat difficult to document why the growth rates were this different. Neither the 1999 Greater Omaha study or the 2002 Greater Nebraska study asked respondents to explain the forces driving employment growth. A general understanding of different economic conditions may partly explain the difference:

- During 1999, Greater Omaha was experiencing a very robust economy with unemployment well below 2% and rapid growth in demand for employees.
- During the first six months of 2002 when the survey documents were completed, economic conditions could be characterized as a mild recession across the Midwest.
- The manufacturing sector of the Greater Nebraska economy had been in a prolonged slow down by 2002. Manufacturing is much more prevalent in rural areas than in the Greater Omaha area.

Employment & Training Budgets

Information Technology employees constituted 3.1% of the workforce for the 79 Greater Nebraska firms. This is well below the 11.5% for Greater Omaha firms. However, for the 49 smallest Greater Nebraska firms, IT employees were 8.1% of all employees, only somewhat less than their urban counterparts. Both studies likely understate the number of IT professionals because most firms reported only their computer center employees as IT professionals. This reporting may understate those IT professionals doing sales, training, marketing, working on the factory floor and other departmental IT professionals.

SUMMARY STATISTICS		
2002 and 1999 Studies		
All firms		
	Gr. Nebraska <i>79 firms</i>	Omaha <i>43 firms</i>
Total Employment	17,699	66,493
Projected Employment in Five Years	19,475	81,812
Percent Change	10.0%	23.0%
<i>Information Technology Employment</i>		
Total IT Employment	548	7,616
Projected Employment in Five Years	659	9,339
Percent Change	20.3%	22.6%

B. Training Budgets

Training budgets for the 49 Greater Nebraska firms reporting these data were \$2,654,817, well below the \$14,256,797 for the 30 Greater Omaha firms reporting these data in 1999. In addition, the Greater Nebraska firms projected a 28% growth to \$3,405,000 in the next five years, while the Omaha employers anticipated a 73% increase to \$26,068,000 in the five years following their 1999 reporting. These results also under report training budgets in both studies because not all employers provided these data and many reported that their training budgets were incomplete.

While the absolute value is quite different, the expenditure per employee was much closer for the two groups. To illustrate, in 2002 the Greater Nebraska firms anticipated spending \$245 per employee, growing to \$273 in five years. The Greater Omaha firms planned to spend \$372 in 1999, increasing to \$519 in five years.

Employment & Training Budgets

Training Budgets – All Employers				
2002 & 1999				
All Firms				
	Gr. Nebraska Firms 2002		Gr. Omaha Firms 1999	
	<u>Current</u>	<u>5-Year Projection</u>	<u>Current</u>	<u>5-Year Projection</u>
Training Budgets	\$2,654,817	\$3,404,900	\$14,256,797	\$26,068,000
Number of Firms Reporting	49	49	30	30
Avg. Training Budget Per Employee	\$ 245	\$ 273	\$ 372	\$ 519
Avg. Training Budget Per IT Employer	\$ 1,120	\$ 1,138	\$ 1,871	\$ 2,427

A very similar pattern also existed for Information Technology professionals. The Greater Nebraska employers reporting these data planned to spend \$1,120 per IT employee in 2002, growing to \$1,138 in five years. Greater Omaha firms planned to spend \$1,871 per IT employee in 1999, growing to nearly \$2,427 in five years.

While the numbers varied, both groups of employers are directing substantial resources to train their employees, particularly Information Technology employees. These patterns reflect the rapid changes within the IT industry, including all facets of computer, communications, business applications and systems software developments. Their increased expenditures also reflect the disproportionate growth in IT employment compared to all employees.

C. How Training Budgets Are Spent

A somewhat different pattern is evident in training expenditures as shown in the following table. This difference appears to be influenced, in part, by firm size. The average number of employees for the 79 Greater Nebraska firms was 224 compared to 1,546 for the Greater Omaha firms. Many larger firms have internal training programs covering a broad array of topics relevant to their employees. Smaller Greater Nebraska firms more frequently use outside resources for such training requirements. The 79 Greater Nebraska firms reported that 26% of their training budget was for internal programs versus 53% for the Greater Omaha firms. Meanwhile, the Greater Nebraska firms' use of external seminars/workshops (37%) was more than double (17.4%) their urban counterparts.

Employment & Training Budgets

Tuition costs for college were the lowest percentage of the budget for both groups of employers at 4.8% for Greater Nebraska firms and 12.1% for Greater Omaha employers.

Finally, in recent years, industry certifications have grown in importance to employers as a means for employees and applicants to validate their mastery of a body of knowledge. At 28.1% of their training budget, the rate of spending by Greater Nebraska firms on Vendor Certifications is nearly twice that projected (13.7%) by urban employers. Both groups are spending more on Vendor Certifications than for college tuition.

Training Budget Allocation 2002 & 1999 Studies Percent of Total Budget				
	Gr. Nebraska Firms 2002		Gr. Omaha Firms 1999	
	<u>Current</u>	<u>5-Year Projection</u>	<u>Current</u>	<u>5-Year Projection</u>
Internal Programs	25.5%	26.8%	52.2%	58.6%
External Seminars/Workshops	37.0%	35.2%	17.4%	14.7%
Tuition/Cost for College	4.8%	5.4%	12.1%	13.8%
Vendor Certifications	28.1%	29.3%	13.7%	10.6%
Other	4.7%	3.3%	4.0%	2.2%

D. Employees & Academic Courses

The percent of all employees taking academic courses was slightly higher for the 79 Greater Nebraska firms (15.4%) compared to 8.3% for Greater Omaha employers. For the Information Technology employees, a similar pattern existed, 13.7% for rural employers versus 8.1% for their urban counterparts.

In both studies, firms believed that substantially more Information Technology employees should be taking courses than are now enrolled. Tuition reimbursement programs continue to be important; however, the Greater Nebraska firms only had 13.4% of their employees on reimbursement programs, less than one-third the rate for urban employers. While the survey data does not provide detailed insight into the difference between the two studies, an observation may be relevant:

- The economic slow down between the 1999 and 2002 studies may have caused some firms to reduce training and education reimbursement budgets.
- Some of the more rural firms may not be located in communities that have a postsecondary education presence, reducing opportunities and hence demand for tuition reimbursement programs.

Employment & Training Budgets

Tuition Reimbursement Programs 2002 & 1999 Studies				
	Gr. Nebraska Firms 2002		Gr. Omaha Firms 1999	
	<u>All Employees</u>	<u>IT Employees</u>	<u>All Employees</u>	<u>IT Employees</u>
Number of Employees in Courses	2,726	75	5,321	615
Number on Tuition Reimbursement	366	23	2,496	323
Percent on Tuition Reimbursement	13.4%	30.6%	46.9%	52.5%
Number That Should Take Courses	3,143	264	9,845	1,701

Academic Disciplines

Table 1 shows the ranking of nine different Academic Disciplines. As stated earlier, business is in a profound period of change. Digitization of the world's knowledge and global networks is having an unparalleled impact on all business, commerce, education, social institutions, expectations, market perspective, etc.

In recent years, many organizations' view of Information Technology has moved from an "important operational issue" to a "strategic issue for the firm." The following rankings are instructive to employers and academic institutions alike as they respond to the increased reliance upon Information Technology and this changing importance of different disciplines.

Table 1

Profile of Academic Disciplines for IT Employees				
All Firms 2002 & 1999 Studies				
<u>Academic Disciplines</u>	Gr. Nebraska		Omaha	
	<u>2002 Rank</u>		<u>1999 Rank</u>	
Networking (LAN/WAN/IP)	1.42	1st	1.11	2nd
Systems Integration	1.73	2nd	1.13	3rd
Technology Management	1.76	3rd	1.19	4th
Telecommunications	2.11	4th	1.36	6th
Systems Development & Business Integration	2.13	5th	1.05	1st
E-commerce	2.40	6th	1.25	5th
Computer Engineering & Systems	2.69	7th	1.72	7th
Technical Marketing	2.85	8th	2.06	8th
Electronic Engineering	2.92	9th	2.39	9th
<i>Rank 1= Most Important 4 = Least Important</i>				

Networking and Systems Integration ranked first and second in importance, respectively, for the Greater Nebraska firms. Those two disciplines ranked second and third, respectively, for the Greater Omaha employers. The relatively high consistency between both groups suggests that no matter the size and geographical location, the future competitiveness of their firms is tied to adequate IT professionals.

Systems Development & Business Integration was the highest ranked Discipline for Greater Omaha firms reflecting, in part, more mainframe environments. It ranked fifth for Greater Nebraska firms. This Discipline also accounts for the largest IT employment for Greater Omaha firms but well below Telecommunications and Networking for the more rural firms. Table 2 shows, however, that the percent of total IT employment is trending down in the Omaha firms for this category. This downward trend in the

Academic Disciplines

percentage of employees comes as the demand for E-commerce, Telecommunications, and Networking increases.

Table 2

Estimated Percent of Employees By Academic Disciplines				
All Firms 2002 & 1999 Studies Percent of IT Employees with These Disciplines				
<u>Academic Disciplines</u>	Gr. Nebraska Firms 2002		Gr. Omaha Firms 1999	
	<u>Current</u>	<u>5-Year Projection</u>	<u>Current</u>	<u>5-Year Projection</u>
Electronic Engineering	9.0%	8.4%	1.8%	1.0%
Telecommunications	16.5%	15.4%	8.5%	9.6%
Systems Integration	10.9%	11.1%	17.2%	14.6%
Computer Engineering & Systems	7.5%	8.5%	14.2%	13.8%
Systems Development & Business Integration	10.1%	10.6%	35.7%	25.5%
Technology Management	10.7%	10.1%	7.8%	8.5%
Technical Marketing	5.6%	6.1%	1.9%	2.8%
E-commerce	7.5%	8.6%	4.1%	12.1%
Networking (LAN/WAN/IP)	16.0%	16.0%	8.8%	10.5%
Other	-	-	-	-
Sub-Baccalaureate	43.2%	40.0%	41.3%	38.2%
Baccalaureate	46.4%	45.2%	47.6%	48.3%
Graduate	10.5%	14.8%	11.0%	13.6%

A. Telecommunications, Networking and E-commerce

The big story in Academic Disciplines appears to be the growing relevancy in Telecommunications, Networking, and E-commerce. In the earlier 1995 Greater Omaha study, Telecommunications/Networking accounted for 8.6% of all IT employees with a projection to grow to 9.1%. E-commerce as a discipline did not exist in nearly any academic institution at that time. By 1999, those three disciplines account for 21% of IT employment for Greater Omaha firms growing to nearly one-third of the IT staff by 2004. Meanwhile, for the much smaller Greater Nebraska firms, these three Disciplines already account for 40% of their IT employees. These smaller firms expect that ratio will remain at 40% over the next five years.

Academic Disciplines

Fastest Growing Academic Disciplines				
All Firms				
2002 & 1999 Studies				
Percent of IT Employees with These Disciplines				
	Gr. Nebraska Firms 2002		Gr. Omaha Firms 1999	
	<u>Current</u>	<u>5-Year Projection</u>	<u>Current</u>	<u>5-Year Projection</u>
<u>Academic Disciplines</u>				
Telecommunications	16.5%	15.4%	8.5%	9.6%
Networking (LAN/WAN/IP)	16.0%	16.0%	8.8%	10.5%
E-commerce	<u>7.5%</u>	<u>8.8%</u>	<u>4.1%</u>	<u>12.1%</u>
Totals	40.0%	40.2%	21.4%	32.2%

B. E-commerce

E-commerce was a new Academic Discipline in the 1999 study. This discipline is at the center of the emerging networked/digital world. Academic institutions that wish to keep curriculum and programs relevant with emerging business trends must develop strong Telecommunications, Networking, and E-commerce courses and programs. This represents a change from classic “computer” based programs (systems design and development, operating systems, engineering, etc.) to the integration and convergence of computer and communication technologies that lead to a new and emerging business and application paradigm.

E-commerce is also the most interdisciplinary topic on the horizon, including many other disciplines such as law, marketing, public policy, music and art, language, graphics, all business disciplines, all Information Technology and engineering disciplines, etc.

C. Educational Achievement of Workers

One-year and two-year IT programs will continue to offer excellent entry opportunities for a career in IT. However, firms in both surveys expressed a desire for more employees with baccalaureate and graduate degrees. With over 40% of all IT employees in both surveys with sub-baccalaureate degrees, substantial opportunities exist for non-traditional student educational offerings.

The data also suggest that migration paths between a community or a technical college degree to a baccalaureate degree must be clear of barriers. This suggests the need for strong articulation agreements between academic institutions that will support both the firm and employees’ needs. Also, more distance learning options, courses offered on the firm’s premises, and other continuing education opportunities would serve rural and urban employees alike.

Applied Areas

Respondents were asked to rank specific Applied Areas within each Academic Discipline. In addition, they were asked to rank how well area colleges and universities were meeting their needs in each Applied Area. The average ranking for all 48 Applied Areas was 2.40 and 1.71, respectively, for the Greater Nebraska and Greater Omaha respondents. Their evaluations of “meets needs,” however, were 2.75 and 2.43, respectively. This high average difference between the rank of Applied Areas and their evaluation of how colleges were “meeting their needs” suggest both groups of employers believe colleges and universities are not meeting their needs as effectively as they would like.

Further analysis of the data from the Greater Nebraska firms shows that individual Applied Areas ranked highest also had the poorest “meets need” score. In fact, in only 1 of the 16 highest ranked academic disciplines did the “meets needs” measurement fall below the average difference of .35:

- Architecture/Platforms

The pattern was the same for the Greater Omaha firms in which only 2 of the 18 highest ranked Applied Areas had “meets needs” below the average difference of .72:

- Architectures/Platforms
- Client/Server

Neither survey documents why the colleges and universities are considered to not meet needs. In many cases, the newest technologies of Telecommunications, E-commerce, and Networking (LAN/WAN/TCP/IP) are disciplines where the colleges and universities were considered least responsive.

The 79 Greater Nebraska firms ranked 16 Applied Areas between 1.0 and 2.2, while the 43 Greater Omaha firms ranked 18 Applied Areas 1.0 to 1.5. The 13 Applied Areas that were identical for both sets of firms are shown in Table 3. Only three Applied Areas were unique to the Greater Nebraska firms and only five were unique to the Greater Omaha firms.

Applied Areas

Table 3 shows that 13 of these Applied Areas were ranked most important in both the Greater Nebraska and Greater Omaha surveys. They are:

- Protocols, ATM, TCP/IP
- Software/Hardware Configuration
- LAN/WAN
- Installation/Implementation
- Architecture/Platforms
- Client/Server
- Project Management
- Security
- Protocols (Open & Proprietary)
- Integration
- Servers, Bridges, Routers and Hubs
- Security Encryption
- Continuity, Interruption and Recovery

The three high scoring Applied Areas unique to the 2002 Greater Nebraska study:

- Data Warehousing
- Business Planning Strategies/Tactics
- Convergence

The Greater Omaha 1999 study had five Applied Areas unique to that study:

- Quality Assurance
- Operating Systems/Compilers/Tools
- Design/Programming
- Specific Technical Competencies
- Development Technologies

Applied Areas

Table 3

Highest Ranked Applied Areas – All Firms 2002 & 1999 Studies				
Greater Nebraska 2002 Applied Area Rankings			Omaha 1999 Applied Area Rankings	
Needs Met by** Coll & Univs (Ranked between 1.0 & 2.2)	Rank* All Firms		Rank* All Firms (Ranked between 1.0 & 1.5)	Needs Met By** Coll & Univs
		TELECOMMUNICATIONS		
2.82	1.86	Protocols, ATM/TCP/IP, etc.	1.32	2.64
		SYSTEMS INTEGRATION		
2.45	1.58	Software/Hardware Configuration	1.20	2.63
2.39	1.61	LAN/WAN	1.12	2.11
2.62	2.11	Installation/Implementation	1.22	2.94
		Quality Assurance →	1.39	2.27
		COMPUTER ENGINEERING & SYSTEMS		
		Operating Systems/Compilers/Tools →	1.32	2.13
2.44	2.20	Architectures/Platforms	1.34	1.96
		SYSTEMS DEVELOPMENT & BUSINESS INTEGRATION		
2.81	2.07 ←	Data Warehousing		
2.35	1.77	Client/Server	1.38	1.94
		Design/Programming →	1.11	1.87
		TECHNOLOGY MANAGEMENT		
2.66	2.04 ←	Project Management	1.16	2.38
2.70	2.20 ←	Business Planning Strategies/Tactics		
		Specific Technical Competencies →	1.38	2.67
		E-COMMERCE		
		Development Technologies →	1.41	2.58
2.90	2.17	Security	1.28	2.92
		NETWORKING (LAN/WAN/TCP/IP)		
3.05	1.84	Protocols (Open & Proprietary)	1.27	2.19
2.29	1.90	Integration	1.18	2.60
3.01	2.17 ←	Convergence		
2.77	1.65	Servers, Bridges, Routers & Hubs	1.33	2.63
3.01	1.63	Security Encryption	1.44	2.70
3.08	1.63	Continuity, Interruption & Recovery	1.36	2.66

* Rank 1 = Most Important 4 = Least Important
 ** Rank 1 = Meets Needs 4 = Does Not Meet Needs

Technology Areas

The two studies send some relatively clear signals in certain Technology Areas, as shown in Table 4.

Data is projected to have increased importance in the next five years, just as it does currently for both Greater Nebraska (2002) and Greater Omaha (1999) firms. Over nearly ten years of AIM studies, Data has consistently scored very high as a technology. What is changing is the broadening array of issues associated with Data, such as warehousing it, mining it, securing it, communicating it, encrypting it, managing it, etc. Data will remain an important area for study and teaching for quite some time.

Telecommunications was ranked highest in the 2002 study by Greater Nebraska firms and second highest in the 1999 study of the Greater Omaha firms (Table 4). It is anticipated to be of greater importance in five years by both groups.

Client/Server ranked in the top four in importance for both groups.

Human Factors Engineering was ranked below average in both studies. However, in the future, these topics appear to command greater interest.

Electronic Commerce (E-commerce) was not ranked in the 1999 Greater Omaha study. It is ranked important in the next five years by the 79 Greater Nebraska firms.

Table 4

Technology Areas Ranked Between 1.0 & 2.0				
All Firms				
2002 & 1999 Studies				
<u>Technology Areas</u>	Gr. Nebraska Firms 2002		Gr. Omaha Firms 1999	
	<u>Current</u>	<u>5-Year Projection</u>	<u>Current</u>	<u>5-Year Projection</u>
Languages	2.57	2.27	1.87	1.62
Data	1.69	1.38	1.54	1.31
Telecommunications	1.54	1.25	1.72	1.32
Client/Server	1.90	1.24	1.92	1.70
Human Factors Engineering	2.64	2.22	2.39	1.84
Educational Technology – Learning Services	2.41	2.06	2.48	1.84
Electronic Commerce	2.47	1.85	-	-
Multimedia – Technology	2.59	2.22	2.56	1.77
Multimedia - Presentation	2.41	2.19	2.55	2.00
<i>Rank 1= Most Important 4= Least Important</i>				

Vendor Certifications & Other Special Topics

Vendor Certifications have become increasingly popular with firms and employees alike. The range of software/hardware vendors with certification programs has increased. Many employers pay for certification classes, and students who successfully complete certification testing frequently enjoy increased salary and enhanced value to their employer.

Vendors are also making certification content available to secondary schools. Currently, several urban and rural Nebraska high schools offer Cisco certification classes. Cisco and other certification classes are also offered by colleges and universities. Some colleges include certification content in their courses, allowing the student to receive academic credit plus being prepared to take a Vendor Certification exam upon completion of the course.

Table 5 below shows how the Greater Nebraska and Greater Omaha firms ranked Vendor Certifications. Microsoft was highly ranked by both sets of employers. Rural employers ranked Cisco relatively high just as urban employers viewed Oracle as an import certification.

Table 5

Ranking of Vendor Certifications All Firms 2002 & 1999 Studies				
<u>Vendor Certification</u>	Gr. Nebraska Firms 2002		Gr. Omaha Firms 1999	
	<u>Current</u>	<u>5-Year Projection</u>	<u>Current</u>	<u>5-Year Projection</u>
Microsoft	1.87	1.61	1.66	1.48
Novell	3.49	3.39	3.25	3.45
Cisco	2.18	1.65	2.48	2.56
Lotus Notes	3.55	3.41	2.49	2.49
Oracle	3.32	2.82	1.64	1.67
PeopleSoft	3.86	3.85	2.62	2.69
Linux	3.61	3.06	-	-

Rank 1= Most Important 4= Least Important

In the 2002 Greater Nebraska study, additional special topics were ranked. These rankings (shown below) illustrate that communication technologies and database issues are considered important by employers. WAN/LAN technologies with a score of 2.02 ranked important now; and, with a score of 1.53 in five years, it is the most important or highest ranked area in the future. Appendix C shows a complete list and scoring of these professional development topics for the 79 Greater Nebraska firms.

Vendor Certifications & Other Special Topics

Table 6

RANKING OF PROFESSIONAL DEVELOPMENT TOPICS		
ALL FIRMS		
Professional Development Topics	2002 All Firms	In 5 Years All Firms
WAN/LAN	2.04	1.53
TCP/IP	2.02	1.60
VPN	2.39	1.69
Wireless	2.69	1.61
Project Management (PPM)	2.59	1.96
Security (SANS/CISSP)	2.04	1.85
Disaster Planning	2.04	1.72
HTML	2.54	1.97
SQL	2.15	1.79

Rank 1 = Most Important 4 = Least Important

Conclusions

The 2002 study of 79 Greater Nebraska employers, most from smaller communities and rural areas across the state, shows needs very similar to those reported by 43 urban Greater Omaha employers in 1999. However, important areas of differences were also documented. Both studies had sufficient numbers of firms with sufficient employment to fairly represent the needs of all employers across the state. The two studies represented two distinctly different populations, both in terms of size of firms and geographical location. As noted above, however, these geographic and demographic differences did not mean they had different demands for educational services in Information Technology.

Average training budgets showed very similar patterns, even though the amounts varied. The 79 Greater Nebraska firms were spending \$245 per employee for training, compared to \$372 for their Greater Omaha counterparts. However, the more rural employers were spending \$1,120 for training per IT professional, compared to \$1,871 for the Greater Omaha firms in 1999. Both groups of employers are spending more on their IT employees reflecting, in part, a discipline that is changing so rapidly, employees must train to keep current and relevant.

The average number of employees per firm in the 2002 Greater Nebraska study was 224 compared to 1,546 for the 1999 Greater Omaha study. The practical implication of the different sized firms is suggested in the way training budgets were spent. The Greater Omaha firms were spending 53% of their budgets through internal programs, compared to 26% for the smaller Greater Nebraska employers. For the smaller companies, external workshops were more important at 37% of their budget. Vendor Certifications accounted for 28% of the smaller Greater Nebraska firms training budgets, compared to 14% for the Greater Omaha firms. Finally, tuition reimbursement was the smallest training budget item at 5% for the small Greater Nebraska firms and 12% for Omaha employers.

IT employees accounted for 11.4% of all employees in the larger Greater Omaha firms, compared to 3.1% for the smaller Greater Nebraska firms. This difference reflects, in part, the different nature of business between the two areas. Data-sensitive and communications-sensitive firms with large centralized data processing, communications, developments centers and enterprise-wide electronic platforms, command more IT specialists per employee than some manufacturing, retail, and smaller employers.

Within Academic Disciplines and Applied Areas, the consistency between the smaller Greater Nebraska firms and Greater Omaha employers was very similar. For example, three of the top four Academic Disciplines for the more rural firms were also in the top four Disciplines for the Greater Omaha firms.

Conclusions

Academic Discipline	Gr. Nebraska Study Ranking 2002	Gr. Omaha Study Ranking 1999
Networking (LAN/WAN/IP)	#1	#2
Systems Integration	#2	#3
Technology Management	#3	#4
Telecommunications	#4	#6

Both groups of employers were focused on the emerging electronic business paradigm. The three Academic Disciplines shown below will account for nearly one-third of all IT employees in the near future. Compared to historic computer-based application development and operating systems curricula, this marks an additional demand for program offerings by academic institutions.

Academic Discipline	Percent of IT Employment			
	Greater Nebraska Study		Greater Omaha Study	
	2002	In 5 Years	1999	In 5 Years
Telecommunications	16.5	15.4	8.5	9.6
Networking (LAN/WAN/IP)	16.0	16.0	8.8	10.5
E-commerce	<u>7.5</u>	<u>8.8</u>	<u>4.1</u>	<u>12.1</u>
Totals	40.0	40.2	21.4	32.2

Ten years ago, much of the content and subjects implied by these three Academic Disciplines did not exist in the industry, and, if they existed, most schools did not have curricula offerings. This rate of growth for new specific disciplines within the IT professional community has probably never been witnessed before. It reflects profound changes in the nature and character of the IT profession and the business expectations for Information Technology within the business community.

Firms were also asked to rank the importance of 48 Applied Areas. These Applied Areas are equivalent to courses that might be offered within a given Academic Discipline. The weighted score for all 48 Applied Areas was 2.40 for the 79 Greater Nebraska firms and 1.71 for the Greater Omaha firms.

Reflecting very similar requirements, 13 of the 16 highest ranked Applied Areas for the Greater Nebraska firms were identical to the 18 highest ranked Applied Areas for the Greater Omaha firms. This very high consistency also suggests that curriculum requirements of business are largely the same no matter the geographical location, size, and/or nature of the business of the firm.

Conclusions

In summary:

- Thirteen Applied Areas were ranked most important in both studies.
- Three high scoring Applied Areas were unique to the smaller Greater Nebraska firms.
- Five high scoring Applied Areas were unique to the larger Greater Omaha firms.
- Data, Telecommunications, Client Server, and E-commerce were the highest scoring technology areas.

Profound and Dramatic Change

The major story in these two studies is not the high degree of similarity or apparent inconsistencies between rural and urban employers. These two studies document, in many respects, the similarity of demand for educational services during a time of profound and dramatic change in the way businesses view their organization, market, products, competition and processes. No matter the size, location or type of business, Information Technologies are changing the business world.

Because of the World Wide Web, it is hard to identify a firm that has not or will not change their view of:

- Their product or service offering
- Their market
- Their method of sales
- Their customer relationships
- Their supplier relationships
- Their pricing
- Their business

In the public policy arena:

- New businesses relocating to a region want assurances of no tax on E-sales. If assurances cannot be given, they will move their server.
- Geography and distance will become less important.
- Copyright, patent, signature verification, law, ethics, privacy, etc. are in uncharted waters.

In the emerging E-world, the relevance of IT has changed profoundly. For many firms and industries, Information Technology was an important “operational issue.” The MIS department had to be soundly and efficiently run. Local and wide area networks were used to link all computerized workstations, providing accurate networks and systems essential to sound operations in the enterprise. The business is increasingly reliant on a stable electronic platform from which to run corporate operations.

For many firms, however, Information Technology has moved from an “important operational” issue to a “strategic issue.” In firm after firm, successful strategic use of

Conclusions

computer networked, Web-based technology has created enormous opportunity, for both efficient internal operations and restructuring service offerings, reaching back to suppliers and out to customers. In many cases, operating costs were sharply reduced while restructuring the industry. Ameritrade and stock transactions are examples as are Amazon.com and the restructuring of book, CD and toy sales, delivery of educational content, etc.

The catalog industry has moved to Web technologies very quickly. Research of any kind – consumer, business, academic, etc. – is now most productive on the Web. Web-based recruiting, real estate, and auto sales are affecting newspaper strategies, trucking and transportation logistics are being redesigned around GPS and other technologies. The list goes on.

Never has there been, in such a short time, such a profound and dramatic change in the way business views their organizations, markets, products and processes!

As all Information Technology disciplines have become more important, it has been nearly impossible for the academic community to respond with the programs and curriculum to meet the changing needs of employers. Unfortunately, there appears to be no slowing in the rate of change so college and university curriculums will be under intense pressure for years to come. These fast paced changes in business requirements will increasingly be at odds with the more deliberate rate of change in some colleges and universities.

Finally, employers' views of staffing may also change. More firms may embrace a "buy" strategy to staff fast changing business requirements. This argument is best expressed in a recent Department of Commerce publication.

As time has become an increasingly important factor of competitiveness for many employers of IT workers, the time available to retrain existing employees or train new employees in the skills needed for new projects has diminished.

In this environment, many companies have concluded that they cannot afford the time penalty and the uncertainty associated with "making" the employees they need (through training or retraining) and are, instead, pursuing a "buy" strategy, seeking the exact skills and experience they need for a particular project and paying a premium for it. Or, as reported by the Gartner Group, "the pace of technological change is making the outside market the best source and repository of intensive technology skills."¹

This trend is likely to further intensify the business demand for specific technical competencies. That demand is also likely to result in different and changing expectations from college and university curriculums.

¹ Source - The Digital Workforce: Building Infotech Skills at the Speed of Innovation; U.S. Department of Commerce, Office of Technology Policy; June, 1999

Appendix A

Survey Participants - 2002 Greater Nebraska Survey

Advanced Computer Services
ALLTEL
AmFirst Bank, N.A.
Airwave Wireless Communications
Avera St. Anthony's Hospital
Becton Dickinson
Brooks Law Offices, P.C.
Bureau of Reclamation
Central Nebraska Medical Clinic, P.C.
Chase County Community Hospital
City of McCook
City of Ogallala
City of Scottsbluff
CNH
Community Hospital – McCook
Computer Concepts, Inc.
Connecting Point
Copycat Printing
Duncan Aviation
Education Service Unit #13
Education Service Unit #15
Farm Credit Services of America
Farmers Cooperative Association
Farmers State Bank
First National Bank
Frenchman Valley Farmers Cooperative, Inc.
Frontier
Gering Public Schools
Great Plains Capital
Hemingford Cooperative Telephone Co.
Heritage Group
Hiland-Roberts, Inc.
Hi-Line Cooperative, Inc.
Holiday Inn Express
Hornady Manufacturing Company
Information Analytics
KDUH Television
Keith County
Kildore Lumber Co.
Kircher & Associates Reality, Inc.
Lots to Love, Inc.
McCook Area Chamber of Commerce
McCook Clinic, P.C.
McCook Daily Gazette
McCook Eye Clinic, P.C.
McCook National Bank
McCook Public Schools
McPherron Skiles Joel & Loop
Memorial Health Center
Mid-Plains Community Area
Miller, Neidhardt & Associates, P.C.
Nebraska Air National Guard
Nebraska Public Power District
Nebraska State Patrol
Norfolk Iron and Metal, Inc.
Northwest Electric, Inc.
Nucor Steel
Panhandle Community Services
Parker Hannifin Corporation
Pathology Services, P.C.
Pinpoint
Principal Financial Group
Pro Printing
Red Willow County FSA
Republican Valley Motor Co.
Saint Francis Medical Center
Sargent Pipe Company, Inc.
Sidney Medical Associates
Southwest PPD
State of Nebraska, Dept. of Correctional Services
The Goodyear Tire & Rubber Co.
Transcrypt
Union Bank & Trust
Valley Bank
Vishay Dale Electronics
Western Sugar Company
Wiedeman Financial Services, Ltd.

Appendix A

1999 Greater Omaha Participants

Advanced American Technologies	Lyman Richey Corporation
Bass & Associates	Midwest Computer Products
Behlen Manufacturing Co.	Mutual of Omaha Companies
Blue Cross & Blue Shield of NE	Nebraska Methodist Health Systems
CalEnergy Company, Inc.	Omaha Public Power District
Carlson Hospitality Worldwide	Omaha World-Herald
Central States Health & Life Company	Omnium Worldwide, Inc.
ConAgra Foods, Inc.	Oriental Trading Company
Corporate Express Doc & Print Management	Pamida, Inc.
CSG Systems, Inc.	PlaNet 2000 Software
Double E Computer Systems	PKS Information Services, Inc.
Farm Credit Services of America	Priority Technologies
First Data Corporation	Richman Gordman
First National Bank of Omaha	St. Joseph Hospital
Great Plains Communications, Inc.	The Schemmer Associates
Guarantee Mutual Life Insurance	Travel & Transport
Inacom Corporation	USWEST Communications
Kiewit Construction	Union Pacific Railroad Co.
KMS Associates	Valmont Industries
Kutak Rock Law Offices	Word Data Business Systems
Leopard, Inc.	World Insurance

Appendix B - 1999 Survey

1999 SURVEY OF GREATER OMAHA BUSINESS REQUIREMENTS FOR IT COMPANY EMPLOYMENT AND EDUCATION OPERATIONS SUMMARY GREATER OMAHA ONLY 43 FIRMS

All Greater Omaha Employees	1999	Forecast In 5 Years	Percent Change
1. Number of All Employees (Greater Omaha)	66,493	81,812	23.04
2. Number of All Employees Now Taking Academic Credit Courses	5,321		
3. Number of All Employees You Feel Should Be Taking Academic Courses	9,845		
4. Number of Those Employees Taking Academic Credit Courses Who Are on a Company Tuition Reimbursement Program:	2,496		
5. Education/Training Budget-Omaha Employers	\$14,256,797	\$26,063,644	82.82
Amount of Training Budget for:			
a. Internally Provided Training Programs	\$ 7,529,858	\$15,268,043	114.29
b. External Seminars & Workshops	\$ 2,477,293	\$ 3,819,479	54.18
c. Tuition & Cost for College Courses	\$ 1,720,507	\$ 3,604,425	109.41
d. Industry Certificates	\$ 1,954,031	\$ 2,802,047	43.40
e. Other	\$ 574,957	\$ 569,464	-0.95
Greater Omaha Information Technology Employees			
6. Number of Information Technology Employees	7,616	9,339	22.60
5. Number of Information Technology Employees Now Taking Academic Credit Courses	615		
6. Number of Information Technology Employees You Feel Should be Taking Academic Courses	1,701		
7. Number of Those I.T. Employees Taking Academic Credit Courses Who Are On a Company Tuition Reimbursement Program	323		
10. Education/Training Budget - I.T. Employees Only	\$ 9,429,371	\$16,272,275	72.60

Appendix B - 1999 Survey

PROFILE OF ACADEMIC DISCIPLINES FOR INFORMATION TECHNOLOGY EMPLOYEES GREATER OMAHA OPERATIONS ONLY 43 FIRMS

Estimated Percent of Employees by Academic Disciplines

ACADEMIC DISCIPLINES	Rank Importance of Discipline to Your Firm*	% IT Employees with these Discipline 1999	%Employees with these Disciplines in 5 yrs
Electronic Engineering	2.39	1.8	1.0
Telecommunications	1.36	8.5	9.6
Systems Integration	1.13	17.2	14.6
Computer Engineering & Systems	1.72	14.2	13.8
Systems Development & Business Integration	1.05	35.7	25.5
Technology Management	1.19	7.8	8.5
Technical Marketing	2.06	1.9	2.8
E-commerce	1.25	4.1	12.1
Networking (LAN/WAN/IP)	1.11	8.8	10.5
	% Sub - Baccalaureate	41.3	38.2
	% Baccalaureate	47.6	48.3
	% Graduate	11.0	13.6

Estimated Number of Employees by Academic Disciplines

ACADEMIC DISCIPLINES	Rank Importance of Discipline to Your Firm*	# IT Employees with these Disciplines 1999	# Employees with these Disciplines in 5 yrs	Percent Change
Electronic Engineering	2.39	137	96	-29.93
Telecommunications	1.36	642	894	39.25
Systems Integration	1.13	1296	1369	5.63
Computer Engineering & Systems	1.72	1066	1290	21.01
Systems Development & Business Integration	1.05	2686	2381	-11.36
Technology Management	1.19	583	791	35.68
Technical Marketing	2.06	146	262	79.45
E-commerce	1.25	308	1126	265.58
Networking (LAN/WAN/IP)	1.11	661	979	48.11
	# Sub - Baccalaureate	3149	3565	13.21
	# Baccalaureate	3626	4506	24.27
	# Graduate	841	1268	50.77

* 1 = Most Important 4 = Least Important

Appendix B - 1999 Survey

IMPORTANCE OF APPLIED AREAS

43 FIRMS

Rank Each Applied Area	*Rank of Area	**Need Met by Colleges & Univs	*** Differences
Electronic Engineering			
- Computer Systems/Architecture	2.83	3.22	0.39
- Directories, Circuits & Systems	2.51	3.19	0.68
- Comm's, Control & Signal Processing	2.60	3.19	0.59
- Other			
Telecommunications			
- Protocols, ATM, TCP/IP, Frame Relay, ADSL	1.32	2.64	1.32
- Wireless	2.08	2.69	0.61
- Telephony	1.74	2.58	0.84
- Fiber Optics	1.66	2.70	1.04
- Other			
Systems Integration			
- Software/Hardware Configuration	1.20	2.63	0.87
- LAN/WAN	1.12	2.11	0.99
- Technical Purchasing (RFI, RFP, ROI)	1.62	2.66	1.04
- Applied Mfg, Production, Operations	1.68	2.31	0.63
- Installation/Implementation	1.22	2.94	1.72
- Quality Assurance	1.39	2.27	0.88
- Other			
Computer Engineering & Systems			
- Operating Systems/Compilers/Tools	1.32	2.13	0.81
- Language/CASE	1.70	1.96	0.26
- AI/ES/Inference Engines	2.08	1.77	-0.31
- Architectures/Platforms	1.34	1.96	0.62
- Capacity and Performance Planning	1.58	2.47	0.89
- Numerical Computing, Algorithms	2.12	1.56	-0.65
- Operations Research	2.26	2.17	-0.09
- Standards/Documentation	1.61	2.46	0.85
- Other			
Systems Development & Business Integration			
- Methodology	1.61	2.24	0.63
- Data Warehousing	1.72	2.18	0.46
- Client/Server	1.38	1.94	0.56
- Business Planning/Re-Engineering	1.77	2.45	0.68
- Human Factors Engineering	2.34	2.80	0.46
- Design/Programming	1.11	1.87	0.76
- Decision Support Systems	1.75	1.81	0.06
- Other			
Technology Management			
- Project Management	1.16	2.38	1.22
- Business Planning Strategies/Tactics	1.67	2.35	0.68
- Specific Technical Competencies	1.38	2.67	1.29
- Communications Law, Regulation	2.22	2.50	0.28
- Legal/Ethical/Human Resource Mgmt.	2.14	2.37	0.23
- Technology & Social/Economic Change	2.27	2.87	0.60
- Other			

*1 = Most Important 4 = Least Important

**1 = Meets Needs 4 = Does Not Meet Needs

*** A positive value suggests needs are not being met. A negative value suggests needs are being met.

Appendix B - 1999 Survey

IMPORTANCE OF APPLIED AREAS

43 FIRMS

(Continued)

Rank Each Applied Area	*Rank of Area	**Need Met by Colleges & Univs	*** Differences
Technical Marketing			
- Business Planning, Strategies, Tools	2.09	2.51	0.42
- Technical Competencies	1.82	2.49	0.67
- Marketing Concepts	2.30	2.43	0.13
- Other			
E-commerce			
- Development Technologies	1.41	2.58	1.17
- Legal/Public Policy Issues	2.15	2.74	0.59
- Business Opportunity/Risk	1.90	2.69	0.78
- Management & Control	1.74	2.69	0.95
- Security	1.28	2.92	1.64
- Other			
Networking (LAN/WAN/IP)			
- Protocols - Open and Proprietary	1.27	2.19	0.92
- Integration	1.18	2.60	1.42
- Unification, Convergence	2.15	2.66	0.51
- Servers, Bridges, Routers and Hubs	1.33	2.63	1.30
- Security Encryption	1.44	2.70	1.26
- Continuity, Interruption & Recovery	1.36	2.66	1.30
- Other			
Overall Average	1.71	2.43	0.72

*1 = Most Important 4 = Least Important

**1 = Meets Needs

4 = Does Not Meet Needs

*** A positive value suggests needs are not being met. A negative value suggests needs are being met.

Appendix B - 1999 Survey

RANKING* OF TECHNOLOGY AREAS ALL 43 FIRMS

Technology Areas	*Rank	
	1999	In 5 Years
- Languages	1.87	1.62
- Data	1.54	1.31
- Telecommunications	1.72	1.32
- Client/Server	1.92	1.70
- Human Factors Engineering	2.39	1.84
- Educational Technologies Learning Services	2.48	1.84
- CAD/CAM/CAE	3.36	2.87
- Object-Oriented Design	2.04	2.14
- Artificial Intelligence	3.03	2.55
- Multimedia - The Technologies	2.56	1.77
- Multimedia - Presentation	2.55	2.00
- Virtual Reality	3.17	2.25

* 1 = Most Important 4 = Least Important

RANKING* OF VENDOR CERTIFICATIONS 10 FIRMS WITH LESS THAN 100 EMPLOYEES

Vendor Certifications	Now	5 Years
Microsoft	1.66	1.48
Novel	3.25	3.45
Cisco	2.48	2.56
Lotus Notes	2.49	2.49
Oracle	1.64	1.67
PowerBuilder	3.21	3.24
PeopleSoft	2.62	2.69
Cold Fusion	3.73	3.55
Other		

*Ranking 1 = Most Important 4 = Least Important

Appendix C - 2002 Survey

RURAL NEBRASKA BUSINESS REQUIREMENTS FOR IT 79 TOTAL FIRMS REPORTING LARGE AND SMALL FIRMS

All Employees – 79 Regional Firms	2002	Forecast In 5 Years	Percent Change
1. Number of All Employees	17,699	19,475	10.03%
2. Number of ALL Employees Now Taking Academic Credit Courses	2,726		
3. Number of All Employees You Feel Should Be Taking Academic Courses	3,143		
4. Number of Those Employees Taking Academic Credit Courses Who Are On a Company Tuition Reimbursement Program:	366		
5. Education/Training Budget	\$2,654,817	\$3,404,900	28.25%
Amount of Training Budget for:			
a. Internally Provided Training Programs	\$ 676,161	\$ 914,153	35.20%
b. External Seminars & Workshops	\$ 982,946	\$1,196,949	21.77%
c. Industry Certificates	\$ 744,835	\$ 998,762	34.09%
d. Tuition & Cost for College Courses	\$ 126,905	\$ 184,266	45.20%
e. Other			
Information Technology Employees			
6. Number of Information Technology Employees	548	659	20.27%
7. Number of Information Technology Employees Now Taking Academic Credit Courses	75		
8. Number of Information Technology Employees You Feel Should be Taking Academic Courses	264		
9. Number of Those I.T. Employees Taking Academic Credit Courses Who Are On a Company Tuition Reimbursement Program	23		
10. Number of Information Technology Employees Now Taking Industrial Certification Courses	104		
11. Education/Training Budget - I.T. Employees Only	\$ 457,163	\$ 537,200	17.51%

Appendix C - 2002 Survey

PROFILE OF ACADEMIC DISCIPLINES FOR INFORMATION TECHNOLOGY EMPLOYEES

Rural Nebraska – 79 Firms

Estimated Percent of Employees by Academic Disciplines

ACADEMIC DISCIPLINES	Rank Importance of Discipline to Your Firm*	% IT Employees with these Disciplines 2002	%Employees with these Disciplines in 5 yrs
Electronic Engineering	2.92	8.95	8.36
Telecommunications	2.11	16.47	15.45
Systems Integration	1.73	10.63	11.08
Computer Engineering & Systems	2.69	7.52	8.46
Systems Development & Business Integration	2.13	10.12	10.59
Technology Management	1.76	10.76	10.11
Technical Marketing	2.85	5.58	6.12
E-commerce	2.40	7.52	8.75
Networking (LAN/WAN/IP)	1.42	15.95	15.94
	% Sub - Baccalaureate	43.15	40.00
	% Baccalaureate	46.36	45.17
	% Graduate	10.50	14.83

Estimated Number of Employees by Academic Disciplines

ACADEMIC DISCIPLINES	Rank Importance of Discipline to Your Firm*	# IT Employees with these Disciplines 2002	# Employees with these Disciplines in 5 yrs	Percent Change
Electronic Engineering	2.92	49	55	12.35
Telecommunications	2.11	90	102	12.85
Systems Integration	1.73	58	73	25.32
Computer Engineering & Systems	2.69	41	56	35.21
Systems Development & Business Integration	2.13	55	70	25.97
Technology Management	1.76	59	67	12.95
Technical Marketing	2.85	31	40	32.07
E-commerce	2.40	41	58	39.87
Networking (LAN/WAN/IP)	1.42	87	105	20.19
	# Sub - Baccalaureate	236	263	11.44
	# Baccalaureate	254	298	17.32
	# Graduate	58	98	68.97

* 1 = Most Important 4 = Least Important

Appendix C - 2002 Survey

IMPORTANCE OF APPLIED AREAS

Rural Nebraska - 79 Firms

Rank Each Applied Area	*Rank of Area	**Need Met by Colleges & Univs	*** Differences
Electronic Engineering			
- Computer Systems/Architecture	2.50	2.51	0.01
- Directories, Circuits & Systems	2.86	2.61	-0.25
- Comm's, Control & Signal Processing	2.80	2.77	-0.03
- Other			
Telecommunications			
- Protocols, ATM, TCP/IP, Frame Relay, ADSL	1.86	2.82	0.96
- Wireless	2.42	3.04	0.62
- Telephony	2.31	2.86	0.55
- Fiber Optics	2.56	2.81	0.25
- Other			
Systems Integration			
- Software/Hardware Configuration	1.58	2.45	0.87
- LAN/WAN	1.61	2.39	0.78
- Technical Purchasing (RFI, RFP, ROI)	2.30	2.73	0.43
- Applied Mfg, Production, Operations	3.10	2.75	-0.35
- Installation/Implementation	2.11	2.62	0.51
- Quality Assurance	2.32	2.68	0.36
- Other			
Computer Engineering & Systems			
- Operating Systems/Compilers/Tools	2.35	2.41	0.06
- Language/CASE	3.17	2.66	-0.51
- AI/ES/Inference Engines	3.25	2.71	-0.54
- Architectures/Platforms	2.20	2.44	0.24
- Capacity and Performance Planning	2.47	2.91	0.44
- Numerical Computing, Algorithms	3.13	2.65	-0.48
- Operations Research	2.98	2.62	-0.36
- Standards/Documentation	2.63	2.72	0.09
- Other			
Systems Development & Business Integration			
- Methodology	2.65	2.87	0.22
- Data Warehousing	2.07	2.81	0.74
- Client/Server	1.77	2.35	0.58
- Business Planning/Re-Engineering	2.33	2.89	0.56
- Human Factors Engineering	2.78	2.98	0.20
- Design/Programming	2.45	2.60	0.15
- Decision Support Systems	2.72	2.89	0.17
- Other			
Technology Management			
- Project Management	2.04	2.66	0.62
- Business Planning Strategies/Tactics	2.20	2.70	0.50
- Specific Technical Competencies	2.35	2.81	0.46
- Communications Law, Regulation	2.92	2.99	0.07
- Legal/Ethical/Human Resource Mgmt.	2.62	2.78	0.16
- Technology & Social/Economic Change	2.80	2.99	0.19
- Other			

*1 = Most Important 4 = Least Important

**1 = Meets Needs 4 = Does Not Meet Needs

*** A positive value suggests needs are not being met. A negative value suggests needs are being met.

Appendix C - 2002 Survey

IMPORTANCE OF APPLIED AREAS

Rural Nebraska - 79 Firms

(Continued)

Rank Each Applied Area	*Rank of Area	**Need Met by Colleges & Univs	*** Differences
Technical Marketing			
- Business Planning, Strategies, Tools	2.67	2.53	-0.14
- Technical Competencies	2.60	2.39	-0.21
- Marketing Concepts	2.64	2.59	-0.05
- Other			
E-commerce			
- Development Technologies	2.56	2.66	0.10
- Legal/Public Policy Issues	2.70	2.64	-0.06
- Business Opportunity/Risk	2.62	2.87	0.25
- Management & Control	2.55	2.85	0.30
- Security	2.17	2.90	0.73
- Other			
Networking (LAN/WAN/IP)			
- Protocols - Open and Proprietary	1.84	3.05	1.21
- Integration	1.90	2.99	1.09
- Convergence	2.17	3.01	0.84
- Servers, Bridges, Routers and Hubs	1.65	2.77	1.12
- Security, Encryption, Firewalls	1.63	3.01	1.38
- Continuity, Interruption & Recovery	1.63	3.08	1.45
- Other			
Overall Average	2.40	2.75	0.35

*1 = Most Important 4 = Least Important

**1 = Meets Needs 4 = Does Not Meet Needs

*** A positive value suggests needs are not being met. A negative value suggests needs are being met.

Appendix C - 2002 Survey

RANKING* OF TECHNOLOGY AREAS

Rural Nebraska - 79 Firms

Technology Areas	2002	Rank*	In 5 Years
- Languages	2.57		2.27
- Data	1.69		1.38
- Telecommunications	1.54		1.25
- Client/Server	1.90		1.24
- Human Factors Engineering	2.64		2.22
- Educational Technologies/Learning Services	2.41		2.06
- Electronic Commerce	2.47		1.85
- CAD/CAM/CAE	2.79		2.04
- Object-Oriented Design	2.89		2.35
- Artificial Intelligence	2.99		2.43
- Multimedia - The Technologies	2.59		2.22
- Multimedia - The Presentation	2.41		2.19
- Virtual Reality	3.43		2.56

* 1 = Most Important 4 = Least Important

Appendix C - 2002 Survey

IT CERTIFICATIONS

Rural Nebraska - 79 Firms

Rank Each Certification	*Rank 2002	5 Years
Vendor Certifications		
- Microsoft	1.87	1.61
- Novell	3.49	3.39
- Lotus Notes	3.55	3.41
- Cisco	2.18	1.65
- Oracle	3.32	2.82
- PeopleSoft	3.86	3.85
- Linux	3.61	3.06
- Other		
Technologies		
- WAN/LAN	2.04	1.53
- TCP/IP	2.02	1.60
- VPN	2.39	1.69
- Wireless	2.69	1.61
- Other		
Professional/Other		
- Project Management (PPM)	2.59	1.96
- Security (SANS/ CISSP)	2.04	1.85
- Disaster Planning & Recovery	2.04	1.72
- A+	2.85	2.69
- Net+	3.06	2.63
- Other		
Programming & Development		
- XML	3.01	2.44
- Java/ JavaScript	3.12	2.39
- HTML	2.54	1.97
- C++	3.02	2.57
- Visual Basic	2.51	2.04
- Other		
Database		
- Oracle	2.98	2.42
- SQL	2.15	1.79
- MS-SQL	2.62	2.37
- SQL Server	3.05	3.11
- DB2	3.31	2.62
- Crystal Reports	2.59	2.32
- Other		

*1 = Most Important 4 = Least Important

RESPONSIVENESS OF AREA INITIATIVES

Rural Nebraska - 79 Firms

Rank Each Applied Area	*Rank of Area
<hr/>	
Rank Responsiveness of Area Initiatives in Meeting Your Firm's Educational Needs in IT	
<hr/>	
- Private Trade Schools	2.17
- Community College/Technical Institute	1.82
- 4-Year Colleges & Universities	2.01
<hr/>	
How Prepared Are Graduates to Meet Your Firm's Job Requirements	
<hr/>	
- Private Trade Schools	2.15
- Community College/Technical Institute	1.89
- 4-Year Colleges & Universities	1.96

* 1 = Very Responsive 3 = Seldom Responsive

Appendix C - 2002 Survey

RURAL NEBRASKA BUSINESS REQUIREMENTS FOR IT 49 FIRMS WITH LESS THAN 100 EMPLOYEES

All Employees - 49 Firms With Less Than 100 Employees		2002	Forecast In 5 Years	Percent Change
1.	Number of All Employees	1,548	1,812	17.05%
2.	Number of ALL Employees Now Taking Academic Credit Courses	76		
3.	Number of All Employees You Feel Should Be Taking Academic Courses	293		
4.	Number of Those Employees Taking Academic Credit Courses Who Are On a Company Tuition Reimbursement Program:	14		
5.	Education/Training Budget	\$ 381,700	\$ 455,200	19.26%
	Amount of Training Budget for:			
a.	Internally Provided Training Programs	\$ 65,120	\$ 99,120	52.28%
b.	External Seminars & Workshops	\$ 189,230	\$ 178,635	-5.60%
c.	Industry Certificates	\$ 92,900	\$ 117,570	26.56%
d.	Tuition & Cost for College Courses	\$ 32,250	\$ 50,830	57.61%
e.	Other			
Information Technology Employees				
6.	Number of Information Technology Employees	125	197	57.83%
7.	Number of Information Technology Employees Now Taking Academic Credit Courses	18		
8.	Number of Information Technology Employees You Feel Should be Taking Academic Courses	51		
9.	Number of Those I.T. Employees Taking Academic Credit Courses Who Are On a Company Tuition Reimbursement Program	5		
10.	Number of Information Technology Employees Now Taking Industrial Certification Courses	19		
11.	Education/Training Budget - I.T. Employees Only	\$ 46,000	\$ 68,600	49.13%

Appendix C - 2002 Survey

PROFILE OF ACADEMIC DISCIPLINES FOR INFORMATION TECHNOLOGY EMPLOYEES Rural Nebraska – 49 Firms With Less Than 100 Employees

Estimated Percent of Employees by Academic Disciplines

ACADEMIC DISCIPLINES	Rank Importance of Discipline to Your Firm*	% IT Employees with these Disciplines 2002	% Employees with these Disciplines in 5 yrs
Electronic Engineering	2.55	7.25	6.92
Telecommunications	1.60	20.08	18.13
Systems Integration	1.52	12.83	12.22
Computer Engineering & Systems	2.50	10.32	11.41
Systems Development & Business Integration	2.06	11.71	10.79
Technology Management	1.50	12.27	11.20
Technical Marketing	2.48	4.74	5.30
E-commerce	2.16	7.53	9.78
Networking (LAN/WAN/IP)	1.49	13.11	14.26
	% Sub - Baccalaureate	50.00	38.75
	% Baccalaureate	34.31	37.50
	% Graduate	15.69	23.75

Estimated Number of Employees by Academic Disciplines

ACADEMIC DISCIPLINES	Rank Importance of Discipline to Your Firm*	# IT Employees with these Disciplines 2002	# Employees with these Disciplines in 5 yrs	Percent Change
Electronic Engineering	2.55	17	21	24.64
Telecommunications	1.60	46	54	17.82
Systems Integration	1.52	29	37	24.32
Computer Engineering & Systems	2.50	24	34	44.26
Systems Development & Business Integration	2.06	27	32	20.28
Technology Management	1.50	28	34	19.14
Technical Marketing	2.48	11	16	45.77
E-commerce	2.16	17	29	69.44
Networking (LAN/WAN/IP)	1.49	30	43	41.95
	# Sub - Baccalaureate	115	116	0.87
	# Baccalaureate	79	113	43.04
	# Graduate	36	71	97.22

* 1 = Most Important 4 = Least Important

Appendix C - 2002 Survey

IMPORTANCE OF APPLIED AREAS

Rural Nebraska - 49 Firms With Less Than 100 Employees

Rank Each Applied Area	*Rank of Area	**Need Met by Colleges & Univs	*** Differences
Electronic Engineering			
- Computer Systems/Architecture	2.49	2.51	0.02
- Directories, Circuits & Systems	2.74	2.61	-0.13
- Comm's, Control & Signal Processing	2.82	2.81	-0.01
- Other			
Telecommunications			
- Protocols, ATM, TCP/IP, Frame Relay, ADSL	1.98	2.77	0.79
- Wireless	2.25	2.99	0.74
- Telephony	2.06	2.92	0.86
- Fiber Optics	2.26	2.99	0.73
- Other			
Systems Integration			
- Software/Hardware Configuration	1.63	2.46	0.83
- LAN/WAN	1.69	2.68	0.99
- Technical Purchasing (RFI, RFP, ROI)	2.63	3.33	0.70
- Applied Mfg, Production, Operations	3.14	3.19	0.05
- Installation/Implementation	2.13	3.12	0.99
- Quality Assurance	2.36	3.24	0.88
- Other			
Computer Engineering & Systems			
- Operating Systems/Compilers/Tools	2.36	2.70	0.34
- Language/CASE	3.22	3.07	-0.15
- AI/ES/Inference Engines	3.49	3.17	-0.32
- Architectures/Platforms	2.47	2.76	0.29
- Capacity and Performance Planning	2.37	3.15	0.78
- Numerical Computing, Algorithms	3.07	3.10	0.03
- Operations Research	3.25	3.07	-0.18
- Standards/Documentation	2.60	3.02	0.42
- Other			
Systems Development & Business Integration			
- Methodology	2.69	3.00	0.31
- Data Warehousing	2.37	2.81	0.44
- Client/Server	2.06	2.76	0.70
- Business Planning/Re-Engineering	2.50	2.97	0.47
- Human Factors Engineering	3.14	3.01	-0.13
- Design/Programming	2.86	2.65	-0.21
- Decision Support Systems	2.93	3.00	0.07
- Other			
Technology Management			
- Project Management	2.04	2.66	0.62
- Business Planning Strategies/Tactics	2.20	2.70	0.50
- Specific Technical Competencies	2.35	2.81	0.46
- Communications Law, Regulation	2.92	2.99	0.07
- Legal/Ethical/Human Resource Mgmt.	2.62	2.78	0.16
- Technology & Social/Economic Change	2.80	2.99	0.19
- Other			

*1 = Most Important 4 = Least Important

**1 = Meets Needs 4 = Does Not Meet Needs

*** A positive value suggests needs are not being met. A negative value suggests needs are being met.

Appendix C - 2002 Survey

IMPORTANCE OF APPLIED AREAS Rural Nebraska - 49 Firms With Less Than 100 Employees (Continued)

Rank Each Applied Area	*Rank of Area	**Need Met by Colleges & Univs	*** Differences
Technical Marketing			
- Business Planning, Strategies, Tools	2.15	2.83	0.68
- Technical Competencies	1.85	2.80	0.95
- Marketing Concepts	2.45	3.12	0.67
- Other			
E-commerce			
- Development Technologies	2.71	3.22	0.51
- Legal/Public Policy Issues	2.72	3.28	0.56
- Business Opportunity/Risk	2.58	3.24	0.66
- Management & Control	2.33	2.99	0.66
- Security	1.94	3.14	1.20
- Other			
Networking (LAN/WAN/IP)			
- Protocols - Open and Proprietary	1.83	3.16	1.33
- Integration	1.62	3.10	1.48
- Convergence	1.81	3.13	1.32
- Servers, Bridges, Routers and Hubs	1.39	2.90	1.51
- Security, Encryption, Firewalls	1.38	3.06	1.68
- Continuity, Interruption & Recovery	1.33	3.17	1.84
- Other			
Overall Average	2.36	3.00	0.64

*1 = Most Important 4 = Least Important
 **1 = Meets Needs 4 = Does Not Meet Needs
 *** A positive value suggests needs are not being met. A negative value suggests needs are being met.

Appendix C - 2002 Survey

RANKING* OF TECHNOLOGY AREAS

Rural Nebraska - 49 Firms With Less Than 100 Employees

Technology Areas	2002	Rank*	In 5 Years
- Languages	2.95		2.61
- Data	1.97		1.60
- Telecommunications	1.79		1.48
- Client/Server	1.71		1.38
- Human Factors Engineering	3.05		2.61
- Educational Technologies/Learning Services	2.68		2.29
- Electronic Commerce	2.50		2.09
- CAD/CAM/CAE	2.76		2.35
- Object-Oriented Design	2.90		2.70
- Artificial Intelligence	3.11		2.77
- Multimedia - The Technologies	2.54		2.20
- Multimedia - The Presentation	2.44		2.19
- Virtual Reality	3.14		2.73

* 1 = Most Important 4 = Least Important

Appendix C - 2002 Survey

IT CERTIFICATIONS

Rural Nebraska - 49 Firms With Less Than 100 Employees

Rank Each Certification	*Rank 2002	5 Years
Vendor Certifications		
- Microsoft	1.75	1.80
- Novell	3.49	3.50
- Lotus Notes	3.58	3.64
- Cisco	2.04	1.74
- Oracle	2.89	2.68
- PeopleSoft	3.84	3.94
- Linux	3.45	2.92
- Other		
Technologies		
- WAN/LAN	2.09	1.66
- TCP/IP	2.08	1.83
- VPN	2.23	1.87
- Wireless	2.92	1.94
- Other		
Professional/Other		
- Project Management (PPM)	2.94	1.97
- Security (SANS/ CISSP)	2.07	1.94
- Disaster Planning & Recovery	2.17	1.71
- A+	2.89	2.95
- Net+	3.28	2.84
- Other		
Programming & Development		
- XML	3.11	2.66
- Java/ JavaScript	3.12	2.30
- HTML	2.54	2.10
- C++	3.16	2.92
- Visual Basic	2.64	2.33
- Other		
Database		
- Oracle	2.40	2.08
- SQL	2.41	1.98
- MS-SQL	2.85	2.57
- SQL Server	3.27	3.21
- DB2	3.11	3.06
- Crystal Reports	2.93	2.33
- Other		

*1 = Most Important 4 = Least Important

RESPONSIVENESS OF AREA INITIATIVES

Rural Nebraska - 49 Firms With Less Than 100 Employees

Rank Each Applied Area	*Rank of Area
<hr/>	
Rank Responsiveness of Area Initiatives in Meeting Your Firm's Educational Needs in IT	
<hr/>	
- Private Trade Schools	2.20
- Community College/Technical Institute	1.73
- 4-Year Colleges & Universities	2.14
<hr/>	
How Prepared Are Graduates to Meet Your Firm's Job Requirements	
<hr/>	
- Private Trade Schools	1.96
- Community College/Technical Institute	1.76
- 4-Year Colleges & Universities	2.03

* 1 = Very Responsive 3 = Seldom Responsive

Appendix C - 2002 Survey

RURAL NEBRASKA BUSINESS REQUIREMENTS FOR IT 30 FIRMS REPORTING WITH 100 OR MORE EMPLOYEES

All Employees – 30 Firms Reporting With 100 Or More Employees Percent	Forecast		
	2002	In 5 Years	Change
1. Number of All Employees	16,151	17,663	9.36%
2. Number of ALL Employees Now Taking Academic Credit Courses	2,650		
3. Number of All Employees You Feel Should Be Taking Academic Courses	2,849		
4. Number of Those Employees Taking Academic Credit Courses Who Are On a Company Tuition Reimbursement Program:	351		
5. Education/Training Budget	\$2,273,117	\$2,949,700	29.76%
Amount of Training Budget for:			
a. Internally Provided Training Programs	\$ 611,041	\$ 814,988	33.38%
b. External Seminars & Workshops	\$ 793,716	\$1,018,314	28.30%
c. Industry Certificates	\$ 651,935	\$ 881,935	35.17%
d. Tuition & Cost for College Courses	\$ 94,655	\$ 133,436	40.97%
e. Other			
Information Technology Employees			
6. Number of Information Technology Employees	423	462	9.22%
7. Number of Information Technology Employees Now Taking Academic Credit Courses	57		
8. Number of Information Technology Employees You Feel Should be Taking Academic Courses	213		
9. Number of Those I.T. Employees Taking Academic Credit Courses Who Are On a Company Tuition Reimbursement Program	19		
10. Number of Information Technology Employees Now Taking Industrial Certification Courses	85		
11. Education/Training Budget - I.T. Employees Only	\$ 411,163	\$ 468,600	13.97%

Appendix C - 2002 Survey

PROFILE OF ACADEMIC DISCIPLINES FOR INFORMATION TECHNOLOGY EMPLOYEES Rural Nebraska – 30 Firms With 100 Or More Employees

Estimated Percent of Employees by Academic Disciplines

ACADEMIC DISCIPLINES	Rank Importance of Discipline to Your Firm*	% IT Employees with these Disciplines 2002	%Employees with these Disciplines in 5 yrs
Electronic Engineering	3.20	10.41	9.70
Telecommunications	2.48	13.32	13.06
Systems Integration	1.88	8.72	10.08
Computer Engineering & Systems	2.83	5.08	5.79
Systems Development & Business Integration	2.18	8.72	10.45
Technology Management	1.95	9.44	9.14
Technical Marketing	3.12	6.30	6.91
E-commerce	2.56	7.51	7.84
Networking (LAN/WAN/IP)	1.37	18.40	17.54
	% Sub - Baccalaureate	40.00	40.85
	% Baccalaureate	51.67	49.30
	% Graduate	8.33	9.86

Estimated Number of Employees by Academic Disciplines

ACADEMIC DISCIPLINES	Rank Importance of Discipline to Your Firm*	# IT Employees with these Disciplines 2002	# Employees with these Disciplines in 5 yrs	Percent Change
Electronic Engineering	3.20	33	35	5.23
Telecommunications	2.48	42	47	10.74
Systems Integration	1.88	28	36	30.52
Computer Engineering & Systems	2.83	16	21	28.45
Systems Development & Business Integration	2.18	28	38	35.35
Technology Management	1.95	30	33	9.32
Technical Marketing	3.12	20	25	23.83
E-commerce	2.56	24	28	17.89
Networking (LAN/WAN/IP)	1.37	59	63	7.62
	# Sub - Baccalaureate	127	147	15.75
	# Baccalaureate	164	177	7.93
	# Graduate	27	35	29.63

* 1 = Most Important 4 = Least Important

Appendix C - 2002 Survey

IMPORTANCE OF APPLIED AREAS

Rural Nebraska - 30 Firms With 100 Or More Employees

Rank Each Applied Area	*Rank of Area	**Need Met by Colleges & Univs	*** Differences
Electronic Engineering			
- Computer Systems/Architecture	2.50	2.51	0.01
- Directories, Circuits & Systems	2.93	2.61	-0.32
- Comm's, Control & Signal Processing	2.78	2.74	-0.04
- Other			
Telecommunications			
- Protocols, ATM, TCP/IP, Frame Relay, ADSL	1.79	2.85	1.06
- Wireless	2.52	3.07	0.55
- Telephony	2.45	2.82	0.37
- Fiber Optics	2.72	2.67	-0.05
- Other			
Systems Integration			
- Software/Hardware Configuration	1.55	2.45	0.90
- LAN/WAN	1.56	2.27	0.71
- Technical Purchasing (RFI, RFP, ROI)	2.12	2.48	0.36
- Applied Mfg, Production, Operations	3.07	2.52	-0.55
- Installation/Implementation	2.09	2.39	0.30
- Quality Assurance	2.30	2.45	0.15
- Other			
Computer Engineering & Systems			
- Operating Systems/Compilers/Tools	2.35	2.23	-0.12
- Language/CASE	3.14	2.39	-0.75
- AI/ES/Inference Engines	3.12	2.37	-0.75
- Architectures/Platforms	2.05	2.20	0.15
- Capacity and Performance Planning	2.52	2.75	0.23
- Numerical Computing, Algorithms	3.16	2.32	-0.84
- Operations Research	2.84	2.31	-0.53
- Standards/Documentation	2.65	2.51	-0.14
- Other			
Systems Development & Business Integration			
- Methodology	2.63	2.81	0.18
- Data Warehousing	1.91	2.81	0.90
- Client/Server	1.62	2.13	0.51
- Business Planning/Re-Engineering	2.24	2.85	0.61
- Human Factors Engineering	2.57	2.97	0.40
- Design/Programming	2.23	2.57	0.34
- Decision Support Systems	2.59	2.83	0.24
- Other			
Technology Management			
- Project Management	2.16	2.49	0.33
- Business Planning Strategies/Tactics	2.19	2.52	0.33
- Specific Technical Competencies	2.47	2.73	0.26
- Communications Law, Regulation	3.11	2.87	-0.24
- Legal/Ethical/Human Resource Mgmt.	2.68	2.51	-0.17
- Technology & Social/Economic Change	2.83	2.86	0.03
- Other			

*1 = Most Important 4 = Least Important

**1 = Meets Needs 4 = Does Not Meet Needs

*** A positive value suggests needs are not being met. A negative value suggests needs are being met.

Appendix C - 2002 Survey

IMPORTANCE OF APPLIED AREAS Rural Nebraska - 30 Firms With 100 Or More Employees (Continued)

Rank Each Applied Area	*Rank of Area	**Need Met by Colleges & Univs	*** Differences
Technical Marketing			
- Business Planning, Strategies, Tools	2.88	2.38	-0.50
- Technical Competencies	2.91	2.19	-0.72
- Marketing Concepts	2.72	2.34	-0.38
- Other			
E-commerce			
- Development Technologies	2.50	2.35	-0.15
- Legal/Public Policy Issues	2.70	2.31	-0.39
- Business Opportunity/Risk	2.63	2.67	0.04
- Management & Control	2.65	2.76	0.11
- Security	2.26	2.78	0.52
- Other			
Networking (LAN/WAN/IP)			
- Protocols - Open and Proprietary	1.98	3.00	1.02
- Integration	2.01	2.94	0.93
- Convergence	2.34	2.97	0.63
- Servers, Bridges, Routers and Hubs	1.75	2.71	0.96
- Security, Encryption, Firewalls	1.72	3.00	1.28
- Continuity, Interruption & Recovery	1.76	3.04	1.28
- Other			
Overall Average	2.42	2.61	0.19

*1 = Most Important 4 = Least Important

**1 = Meets Needs 4 = Does Not Meet Needs

*** A positive value suggests needs are not being met. A negative value suggests needs are being met.

Appendix C - 2002 Survey

RANKING* OF TECHNOLOGY AREAS

Rural Nebraska - 30 Firms With 100 Or More Employees

Technology Areas	2002	Rank*	In 5 Years
- Languages	2.37		2.07
- Data	1.53		1.25
- Telecommunications	1.40		1.12
- Client/Server	2.00		1.15
- Human Factors Engineering	2.41		1.99
- Educational Technologies/Learning Services	2.26		1.95
- Electronic Commerce	2.44		1.72
- CAD/CAM/CAE	2.80		1.81
- Object-Oriented Design	2.88		2.16
- Artificial Intelligence	2.92		2.24
- Multimedia - The Technologies	2.62		2.23
- Multimedia - The Presentation	2.38		2.20
- Virtual Reality	3.63		2.45

* 1 = Most Important 4 = Least Important

Appendix C - 2002 Survey

IT CERTIFICATIONS

Rural Nebraska - 30 Firms With 100 Or More Employees

Rank Each Certification	*Rank 2002	5 Years
Vendor Certifications		
- Microsoft	2.04	1.40
- Novell	3.48	3.18
- Lotus Notes	3.52	3.02
- Cisco	2.34	1.56
- Oracle	3.83	3.07
- PeopleSoft	3.88	3.72
- Linux	3.80	3.31
- Other		
Technologies		
- WAN/LAN	1.98	1.39
- TCP/IP	1.96	1.33
- VPN	2.57	1.49
- Wireless	2.38	1.39
- Other		
Professional/Other		
- Project Management (PPM)	2.18	1.95
- Security (SANS/ CISSP)	2.00	1.76
- Disaster Planning & Recovery	1.89	1.73
- A+	2.80	2.43
- Net+	2.82	2.43
- Other		
Programming & Development		
- XML	2.89	2.21
- Java/ JavaScript	3.13	2.48
- HTML	2.55	1.83
- C++	2.87	2.20
- Visual Basic	2.37	1.77
- Other		
Database		
- Oracle	3.70	3.06
- SQL	1.86	1.57
- MS-SQL	2.34	2.14
- SQL Server	2.65	3.00
- DB2	3.53	2.13
- Crystal Reports	2.36	2.31
- Other		

*1 = Most Important 4 = Least Important

RESPONSIVENESS OF AREA INITIATIVES

Rural Nebraska – 30 Firms With 100 Or More Employees

Rank Each Applied Area	*Rank of Area
<hr/>	
Rank Responsiveness of Area Initiatives in Meeting Your Firm's Educational Needs in IT	
<hr/>	
- Private Trade Schools	2.16
- Community College/Technical Institute	1.83
- 4-Year Colleges & Universities	1.96
<hr/>	
How Prepared Are Graduates to Meet Your Firm's Job Requirements	
<hr/>	
- Private Trade Schools	2.23
- Community College/Technical Institute	1.94
- 4-Year Colleges & Universities	1.93

* 1 = Very Responsive 3 = Seldom Responsive