Information Sector Employers and IT Occupations:

Employer Workforce Development Needs in

Bennington County, Vermont

May 2002 (DRAFT -- COMMENTS WELCOME)

Prepared for

Bennington County School and Workforce Partnership
P.O. Box 573, Arlington, VT 05250
802-447-1112 bennstw@adelphia.net

Prepared by

Jean Bacon and Noelle Murphy
Community Works Research and Development
P.O. 264, North Bennington, VT 05257
802-447-1112 jbdt@adephia.net

Funded by

Human Resource Investment Council
Montpelier, VT

Introduction

The Bennington County School and Workforce Partnership is the local Workforce Investment Board in Bennington County, VT. We are charged by the Human Resource Investment Council with investigating workforce development needs in Bennington County, developing strategic plans to meet those needs, and overseeing implementation of those plans in cooperation with employers, training and education providers, and other local institutions.

In our Workforce, Education, and Training Plan released in January 2000, we identified the Information Sector as one of the critical industrials sectors in Bennington County. The Information Sector, as we have defined it, includes the Printing & Publishing industry, Financial Services employers (including commercial banks, insurance companies and brokers, and investment management companies), and IT companies that provide information services and application and software development. Although the Information Sector employs fewer than 10% of all Bennington County employees, average wages in the sector are higher than the country average, and the county has a good technological infrastructure to support the future growth of the sector. The Information Sector also has many desirable qualities such as job flexibility for workers, career ladder potential, and low impact on our natural environment. The Partnership wants to be proactive in nurturing the growth of this sector.

Critical to the growth of this sector will be the availability of workers with a range of computer technology skills. We recognize, however, that workers with computer skills are critical to the health of many industrial sectors, and that many highly skilled IT professionals are employed outside the Information Sector.

This report is our attempt to lay the foundation for a strategic training/education intervention to ensure that the current and future workforce needs, particularly the need for workers with technology skills, in the Information Sector are successfully met. We have approached this task by examining not only the needs of Information Sector businesses, but also the needs of other major employers who utilize IT professionals. Our goal is both to examine the current pool of IT professionals, and the future needs of the companies that are likely to employ them. We are also concerned, though, with understanding the full range of needs for workers with computer skills in the Information Sector to ensure that that sector, in particular, will thrive.

Part I reports on an in-depth study of employer needs. Part II reviews our current training resources (in preparation) and Part III lays out our strategic intervention plan (in development).

Part I -- Employers' Needs

Executive Summary

Based on in-depth interviews with 36 employers, we extrapolated current and future skill needs for the 107 information sector businesses we identified in Bennington County. We also analyzed the skill needs of 11 other majors employers (employers from other sectors with 100 or more employees). Major findings include:

1. In contrast to the "computer-intensive" reputation of the Information Sector, the largest number of workers (39% or 284 employees) in the Information Sector use standard MS Office software to process and organize information in novel ways. The second largest proportion (37% or 271 employees) use computers only in a "data-entry" capacity.
2. In the information sector, employers project a 29% growth in the number of workers they need in the next five years. This translates into 218 new jobs sector wide. Other major employers project only 11% job growth.
3. Most of the new jobs in the information sector (41%) will require strong facility with MS Office applications, as described in 1 above. Including all information sector employers, and employment projections of the 11 other major employers in our sample, we anticipate a minimum of ***150 new jobs*** of this type in Bennington County in the next 5 years***. In terms of numbers, this is our most pressing workforce development need. Based on what employers told us, we must both upgrade the applied MS Office skills of current workers, and prepare a sizable cohort of new workers with strong analytic skills and the capability to use MS Office software to manipulate and analyze information.***
4. The Printing and Publishing industry will have an expanding need for worker with computer-based design and layout capabilities (approximately 20 new jobs over 5 years). Employers are having particular difficulty finding employees with strong design skills ***and*** strong computer skills.
5. The IT sector and some e-commerce businesses will have an expanding need for programmers (approximately 80 new jobs over 5 years). They see their major challenge as finding employees with exprience programming in the particular language they use.
6. We will have a steady need for new systems and network support specialists among both information sector and other major employers (approximately 50 new jobs). Among employers, there is a relatively high degree of satisfaction with the skill level of prospective employees in this category.
7. Jobs in the Information Sector are good jobs in terms of wages, benefits, and opportunities for advancement. The salary ranges for workers in the Information sector, particularly those in IT and financial services companies compared very favorably with the averages wages in Bennington County. Even workers with strong basic computer skills (applied MS Office facility) fared well at other majors employers, where starting wages exceeded the Bennington County average wage. Health, dental, and retirement benefits in our sample of employers were more generous than the statewide average benefits package. IT companies, Printing and Publishing companies, and commercial banks all had opportunities for new workers with basic computer skills to pursue fruitful career ladders.

Part I Employer Needs

Methodology

Out first task was to create a list of area businesses in the information sector and of other major employers (businesses with 100 or more employees, and businesses likely to employ significant numbers of IT workers such as high technology manufacturers). This information was obtained by speaking with employees at the Department of Employment and Training; by searching local web sites, such as those for area chambers of commerce; and by reviewing phone listings. Our initial list changed in the course of our research as we learned about additional employers in the information sector through our interviews, and discovered that some business had folded.

All in all, we identified 107 active businesses in the information sector and 28 other major employers in Bennington County. (See complete listing in Appendix A.) By contacting employers and by working with other public information, we were able to gather information on the number of employees at each business.

Employer Interviews

We conducted extensive interviews with CEOs, human resource managers, or other managerial personnel at 36 businesses, representing some 2,700 employees. In the Information Sector, our sample included 24% of the Information Sector employers identified, and 70% of the employees in all information sector businesses (Printing & Publishing, Financial Services, and Information Technology). (See list of employers included in the sample in Appendix B).

Table 1 - A
Employer Sample

	Total Number of Employers	Number of Employers Interviewed	Percent of Employers Interviewed
Information Sector	104	25	24%
Printing and Publishing	26	6	23%
Financial Services	39	6	15%
Information Technology	39	13	33%
Other Major Employers		11	
Overall Total		36	

Businesses selected for interviews were chosen to represent the major sub-specialties within the industry sector. For example, in Printing & Publishing we interviewed periodical and newspaper publishers, commercial and lithographic printers. In Financial Services we interviewed not only commercial banks, but also insurance agencies, mortgage bankers, and investment advisors. Business in the Information Technology Sector ranged from proprietary software developers,

website developers, providers of information gathering and dissemination services, website hosting services, to PC support providers.

Table 1-B
Employees at Companies Interviewed

	Total Number of Employees	Number of Employees at Companies Interviewed	Percent of All the Sector's Employees Employed by Companies Interviewed
Information Sector	886	619	70%
Printing and Publishing	446	344	77%
Financial Services	318	196	62%
Information Technology	122	79	65%
Other Major Employers		2087	
Overall Total		2706	

In most sectors, we focused our interviews on larger employers to better represent the work experience of the majority of local employees. In the Information Technology sub-sector, however, we also deliberately included some one and two-person organizations and some independent contractors since these very small operations are critical to the organization of work in this sector.[1] Interviews were conducted by phone or in person and lasted about one hour.

Each interview generated a list of the major job categories at the firm that require computer skills. For each job identified, we asked employers about the current number of employees, a five year projection for the number of employees, the typical entry level and maximum wages, commonly used computer programs/language/applications, and any degree or certification required for the position.

Interviewers assigned each job category a level rating based on the types of technological skills required.

Level 1	**Requires rudimentary computer skills**: filling out online forms, moving between different forms and files, retrieving and saving information, elementary word processing
Level 2	**Requires good working knowledge of standard office software**, using one or more of the following to manipulate and format information: word processing, spreadsheets, simple databases, presentation software

[1] Unlike the one and two person operations in the Financial Services sector which tend to be stand alone consulting businesses, the small shops in IT are often sub contractors for each other, and for the larger firms.

Level 3	**Requires facility with industry specific software to produce original materials**: digital media, web pages, graphics design, AutoCAD, specialized financial management software
Level 4	**Requires ability to use a programming language for application or systems programming**
Level 5/6	**Requires knowledge of hardware and its maintenance, the ability to troubleshoot and provide technical support to other computer users at the business, or the ability to administer and maintain computer networks**
Level 7	**Requires advanced knowledge of programming and application or system architecture to conceptualize and design application software or systems software**

Originally, levels 5 and 6 were separated into three distinct skill sets. Level 5 was designated for hardware maintenance, level 6a for technical support, and level 6b for network administration. In the course or our research, however, we discovered that these differentiations were not useful, as many professionals in this field of work were required to perform all of those types of tasks. As a result, we combined them to create level 5/6, which acknowledges the variety of skills required in these positions, while more accurately reflecting the occupations that exist in our county.

If a position required skills at multiple levels, it was ranked at the skill level that seemed foremost among the positions' responsibilities. For example, at some small shops tech support staff also did some programming, or programmers doubled as the tech support person.

Additionally, in our phone interviews with employer, we discussed the types of benefits provided to the employees at each company, employer experiences in hiring and maintaining a qualified workforce, career ladders at each business, and the types of computer training each employer would take advantage of if it were offered. A complete copy of the interview protocol is included in Appendix B.

Job Shadows

While the initial interviews provided us with a wealth of information, including what computer applications and language were being used, interviews with managerial staff could not provide us with a detailed sense of the level of computer skills required for employees in different job categories. For example, a position might require an employee to use EXCEL or to provide tech support to people using a variety of software on a Windows NT operating system, but how well did the employee need to know EXCEL or Windows NT to accomplish his or her work effectively?

A second stage in our analysis of employer needs, then, was to arrange job shadows of selected positions. Shadows lasted between one and two hours and included a brief interview with the employee, and observation of the employee at work. Our job shadow protocol is included in Appendix C. We chose positions to shadow based on our analysis of the priorities for workforce development we identified through the employer interviews. We completed 17 shadows in Bennington County.[2] We are arranging shadows to represent different industrial sectors (our three Information Sector industries and Other Major Employers), since the positions we are targeting often exist in multiple sectors. (See list of companies at which we completed job shadows in Appendix B).

Analysis Note

Throughout this report, we have often separated our findings for the Information Sector and the Other Major Employers. We felt it important to survey businesses that employ 100 or more people, but because total employment among these employers is so much larger than that of businesses in the information sector, we have kept Information Sector and Other Major Employer statistics separate so as not to skew the overall results.

Additionally, the Other Major Employers category represents a wide variety of types of businesses—everything from a skiing facility, to health care providers, to some of the area's manufacturers. Because of this diversity, we hesitate to make sample-based employment projections for the Other Major Employers category as we do for the Information Sector.

[2] In a parallel study in Berkshire County we have completed 8 job shadows. Information from those shadows supplement our knowledge of technology use we observed in the Bennington County shadows.

Results

Current Patterns of Computer Use

Approximately 73% of all jobs across the employers we interviewed require the employee to use a computer to accomplish the majority of his or her work, and 82% of all information sector jobs require extensive use of a computer. It is clear, then, that today's employees must have at least a basic set of computer skills to compete in the labor market, both in the information sector, and to a large extent, in other sectors as well.

Table 2
Employees Using Computers

	Percent Using Computers	Number Using Computers
Information Sector*	82%	725
Printing and Publishing	78%	350
Financial Services	81%	258
Information Technology	96%	117
Other Major Employers**	70%	2695
Overall Total	73%	3420

*** Projection of total sectoral employment based on sample**

**** Actual employment for companies in sample only**

In different sectors, the distribution of job categories across the various computer skill levels varies considerably. In both Financial Services and among Other Major Employers, the majority of employees require only rudimentary computer skills -- akin to data entry.

Table 3
Percent of Employees by Skill Level

	level 1	level 2	level 3	level 4	level 5/6	level 7	Total
Information Sector	37%	39%	9%	8%	5%	1%	100%
Printing and Publishing	36%	47%	14%	0%	3%	0%	100%
Financial Services	53%	40%	6%	0%	2%	0%	100%
Information Technology	7%	16%	4%	49%	20%	4%	100%
Other Major Employers	55%	18%	23%	2%	2%	1%	100%

In Printing & Publishing, there is more emphasis on employees with a comprehensive knowledge of Office software, and of industry specific software required for desk top publishing, circulation management, etc.

Not surprisingly, jobs that require knowledge of programming languages dominate in the Information Technology sector.

Table 4
Number of Employees by Skill Level

	level 1	level 2	level 3	level 4	level 5/6	level 7	Total
Information Sector*	271	284	67	59	39	5	725
Printing and Publishing	127	163	48	1	10	0	350
Financial Services	136	102	15	0	5	0	258
Information Technology	8	19	5	58	24	5	117
Other Major Employers**	1473	475	608	63	48	28	2695
Overall Total	1744	759	675	122	87	32	3420

*** Projection of total sectoral employment based on sample**
**** Actual employment for companies in sample only**

Table 4 gives us an estimate of the number of people currently employed in the Information Sector at various computer skill levels. Together with the employment among the other major employers we interviewed, our overall totals ***suggest an absolute minimum*** number of people employed in Bennington County at various skill levels.

By far, the most commonly used computer applications among area businesses are those in the standard Microsoft Office Suite—Word, Excel, Access and Outlook. Indeed, we feel that the use of these programs may even have been under-reported because their use is so commonplace that employers may not have mentioned them for positions that require even more specialized software. There were 869 reported users of MS Word, 612 users of MS Excel, 438 users of MS Access, and 261 reported users of MS Outlook. Also significant is the 140 reported users of Internet Explorer.

The next most commonly used applications are a series of more specialized programs and languages, knowledge of which generally falls into computer skill levels 3 and 4. These include Quark (71 users), CAD (55), Fed Ex software (49), SYMIX (49), HTML (41), Photoshop (40), PowerPoint (34), FileMaker Pro (33), Illustrator (27), ARGI circulation program (23), Aspects (23), MIPS (23), People Soft (23), WICS (23), and Java (22).

There were 80 other programs or languages in use by area businesses, all of which are used by fewer than 20 employees.

Future Computer Use

As part of our interview, we asked employers to anticipate the numbers of people they will employ ***in five years*** for each position that requires the use of a computer.

Table 5
Anticipated Growth in Number of Employees

	Percent Growth Over 5 Years	Number of New Employees
Information Sector	29%	218
Printing and Publishing	13%	44
Financial Services	19%	50
Information Technology	105%	124
Other Major Employers	45%	655
e-commerce Businesses	87%	570
All others	11%	85

The Information Sector overall reported an anticipated 29% growth, with Information Technology companies anticipating the lion's share of the growth. More than half of all the new jobs in the information sector will be in Information Technology companies.

Other Major Employers we interviewed together anticipated 655 new jobs that will require computer skills in the next five years -- an increase of 45% over the current number of employees. However, our sample of other employers included two employers who are expanding aggressively into e-commerce. Together these two firms will house 570 of the 655 new jobs anticipated by our Other Major Employers, a growth rate of 87% compared to an 11% growth rate among the remainder of the Other Major Employers.

Table 6
Number of New Employees at Each Skill Level in 5 Years

	level 1	level 2	level 3	level 4	level 5/6	level 7
Information Sector*	47	90	32	33	17	0
Printing and Publishing	4	19	21	0	0	0
Financial Services	31	13	5	0	2	0
Information Technology	12	57	6	33	15	0
Other Major Employers**	309	51	207	50	38	0
Overall Total	356	141	239	83	55	0

*** Projection of anticipated sectoral employment based on sample**
**** Projected employment for companies in sample only**

New level 1 jobs in the Information sector that require only the most basic use of the computer (e.g. data entry) will be concentrated in the Financial Services Sector.

In the Information Sector, level 2 jobs -- jobs that require the use of MS Office software -- will see the greatest increase in the number of new employees among all jobs at all skill levels. Based on our sample, we project 90 new level 2 jobs in the information sector in 5 years. Two-thirds of these will be in Information Technology companies. This suggests to us that information technology companies will be increasing their "business" functions significantly as they grow.

New level 3 jobs in the Information Sector -- those that require the use of more specialized applications such as desktop publishing and graphic art programs, among others -- are concentrated in the Printing and Publishing sector. The Printing & Publishing sector, then, appears to be in the midst of a significant shift in their use of technology, stepping up their use of computers in the production of printed material. The lack of any anticipated growth in the number of programmers/web designers in this sector suggests that local employers are not, however, anticipating a move to web-based publication beyond the level that currently exists.

Almost all the anticipated growth in the need for programmers/web designers and systems/networking support and administration in the Information Sectors is among IT companies.

Other Major Employers, however, anticipate growth in jobs for application programmers, web designers (level 4), and systems and networking support and administration staff (level 5) that exceed the number of new jobs that IT companies expect. In planning for workforce needs at these higher and more specialized skill level, then, it is important to look beyond the IT sector proper, and include Other Major Employers as we prepare for our county's future need for IT professionals. As with job growth overall, however, most of the growth in level 4 and 5/6 jobs among Other Major Employers is in firms expanding into e-commerce.

Table 7
Distribution of New Jobs by Sector
(5 Year Projection)

	level 1	level 2	level 3	level 4	level 5/6	level 7	Total
Information Sector	22%	41%	15%	15%	7%	0%	100%
Printing and Publishing	9%	44%	47%	0%	0%	0%	100%
Financial Services	61%	26%	10%	0%	3%	0%	100%
Information Technology	10%	46%	5%	27%	12%	0%	100%
Other Major Employers	47%	8%	32%	8%	6%	0%	100%
Overall Total	41%	16%	27%	10%	6%	0%	100%

The Other Major Employers in our sample, like employers in the Financial Services Sector, anticipate the largest share of job growth among jobs that require only data entry-type computer skills. However, the Other Major employers we spoke to also anticipate 239 new jobs in occupations that require the use of specialized software. The specialized software for these new jobs falls into two groups -- graphic design software and the Computer Assisted Design (CAD)

and related software used in manufacturing. Among the Other Major employers anticipating growth is positions that require graphic design software (mostly advertising and merchandizing positions), the positions also require strong knowledge of MS Office suite applications -- specifically WORD and EXCEL.

Summary

Based on job growth projections among the employers we interviewed then, a variety of computer skill need clusters emerge. To meet Information Sector and sampled Other Major Employer demands for worker with some level of computer skill over the next 5 years will require:

1. A large cohort of workers (300+) with the capability to interact with computers in data entry-type capacities.

2. A modest cohort of workers (~ 150) with comprehensive MS Office Suite skills. This is particularly important for the continued health of the IT sector companies, who will employ half these workers.

3. A sizable number of workers (~ 250) with capabilities in graphic design/desktop publishing software or CAD related software. (we can break down the relative proportion more exactly). The graphic design skills are important to both Printing and Publishing and e-commerce, and the CAD to high tech manufacturers. Workers with graphic design technology skills will also need MS Office skills.

4. A smaller but critical number of programmers (~80) for both IT and e-commerce businesses.

5. A steady stream of systems and network support and administration workers (~50).

Note: Remember that the number estimates are a ***minimum***, based on projections of employment throughout the Information Sector, and actual employment projections by the 11 Other Major Employers in our sample.

Workforce Development Needs

In addition to the portrait of ***future*** workforce needs among information sector businesses and other major employers for workers with various levels of IT skills, during our employer interviews we also discussed ***current*** workforce needs among employers.

- What positions are difficult to fill?
- What additional training or education would benefit your ***incumbent*** workforce?

Critical Skill Shortages

Not surprisingly, the positions that were reported as the most challenging to fill varied considerably from sector to sector.

In Printing & Publishing and Financial Services recruitment challenges generally have little to do with a lack of computer/IT skill among applicants. For example, the most commonly reported challenge among Printing & Publishing businesses were sales and marketing people.[3] Among Financial Services employers, higher-level specialists such as loan documentation specialists, investment advisors and portfolio managers were among the occupations described as recruitment challenges. In both these cases, the issue was that there simply weren't enough applications coming in from people with the requisite experience in the *content area* of the job. There was no mention of the problem of applicants having content skills, but lacking up-to-date technology skills.

Two of the six interviewed employers in the Printing & Publishing industry, however, did mention a current shortage of graphic artists. As with other positions described below that require higher level computer IT skills, and unlike the content-based recruitment challenges described above, there seem to be plenty of applicants, but the quality of the applicants is lacking. In the case of graphic artists, the issue is finding individuals with both strong design skills and strong technology skills.

In the Information Technology Sector, however, because the content *is* technology, lack of applicant with appropriate technology skills is, understandably, the major issue.[4] The major recruitment challenge for IT firms was finding sufficiently skilled programmers (reported by 5 of the 13 firms interviewed). Specific complaints ranged form an inability to find people with both creative/design and programming skills (in firms developing web-based technologies which, because of their small size, often combine the design and programming functions), to complaints of being unable to find programmers with very specific experience writing in particular languages.

In addition to problems recruiting programmers, two IT companies reported difficulty filling sales/marketing and customer service positions. For these positions it was difficult to find people strong in both technical and sales/service skills.

Only one IT company reported difficulty in hiring in system/network administration.

Among the Other Major Employers, again, many of the recruitment challenges were among occupations with content specific to their industries. Among the three companies who mentioned recruiting challenges related to computer/IT skills, one mentioned a shortage of office staff with

[3] Three out of the six companies interviewed reported difficulties in this area.

[4] In our question about difficult-to-fill positions, we asked employers not only which positions, if any, posed recruitment challenges but also about the nature of those challenges. For example, was the issue a lack of applicants altogether, or was it that applicants came forward with adequate skills "on paper," but that technical or other skills were found lacking during the interview process. There was a mix of issues, but applicants with insufficient skills was more often the issue than a lack of applicants altogether. This differs from the situation in Printing & Publishing and Financial Services, where there simply aren't the applicants at all in the needed content areas.

adequate spreadsheet skills, one mentioned difficulty finding programmers with PCL and Visual Basic skills, and one mentioned graphic artists, e-commerce/web programming specialists, and MIS specialists (which, in that company, included database administration and system/network administration professionals).

In terms of critical skills shortages that are *currently* being experienced by employers as they have tried to fill recent and current vacancies in positions that require computer/IT skills, the key needs in descending order of importance are as follows:

1. Programmers (including both software engineers and web-based programming for IT sector and other major employers)
2. Graphic artists (for Printing and Publishing and Other Major Employers - and to some extent in IT firms, who combine web design and programming functions)
3. Systems/Network Administrators (one IT firm and one other major employer)[5]

Throughout all the sectors, there was also a clear dissatisfaction with the skill level among employees with vary basic (i.e. data entry), and general MS Office Suite skills. Though reference to these administrative support positions did not emerge when we asked about recruitment challenges, much discussion of this perceived workforce development need occurred when we asked about employers' priorities of workforce development. ("What positions or skills sets would be your top three priorities for workforce development?"). Eight employers across Printing & Publishing, Financial Services, and Other Major Employers specifically mentioned a need to upgrade basic MS Office skills, and six employers mentioned basic English, math and problems solving skills as critical workforce development needs.[6]

Incumbent Worker Skill Development Needs

Almost all the employers we interviewed expressed interest in further technology training for their current employees. The number of employers (out of 26 who responded when explicitly asked about training for incumbent employees) acknowledging need for different types of training can be found in Table 8 (see next page).

When comparing this list of training interests for their current employees with the information employers provided when we discussed recruitment problems and priorities for workforce development, we see some important addenda to our list of current critical occupation/skills needs:

- In addition to developing a cadre of more highly skilled programmers to meet current hiring needs, employers also seem to be interested in upgrading some basic internet programming skills among the current staff. Though they did not share concerns about the quantity or quality of web

[5] Surprisingly, most of the major employers contract out their system/network administration, PC support , and database administration work.

[6] Much like other employers we interviewed for our January 2000 Workforce, Education and Training plan., employers in this sample are also looking for improvement in a variety of "soft skills," such as good "people skills," the ability to learn quickly, having strong motivation, and the ability to work on a team.

design and website production staff, through their training interests and in our conversations, they did express a desire to have more of their employees trained to be able to participate in maintaining and updating their web-based operations (e.g. maintaining a company website).

- Database construction skills, too, did not emerge as a critical workforce development need. However, there is strong interest in providing additional database construction training to current employees. Our sense from the interviews is that this interest stems from companies' sense that databases are "important", or that some of the database functions that are currently handled off-site by parent companies or contractors and may be able to be brought in-house, rather than a sense (as is the case with other MS Office software) that their current users are not fully competent in database construction and administration.

- Network/system maintenance, administration and development is another area in which few employers mentioned recruitment problems, or included jobs/skills related to this category in their list of high priority workforce development needs. Yet training in this area for incumbent employees is a major interest. As with database construction and administration, we sense that this interest may be motivated by a desire to cultivate more systems-savvy employees within their organization, and bring some services that they currently contract out, in-house.

Table 8
Employer Training Interests

	Number of Employers Expressing Interest	Application/ Language
Basic Computer Competencies (working on the desktop, managing e-mail, searching the internet)	15	
Advanced Word Processing	15	WORD
Spreadsheets	15	EXCEL
Basic Graphics	11	Photoshop
Mid to Advanced Level Graphics	14	Photoshop
Desktop Publishing	10	Quark
Basic Web Design/ HTML Programming	12	HTML
Mid-level Internet Programming	12	Javascript
Advanced internet programming	9	C++, Java, XML
Database Construction	18	Access
Database Integration	13	Cold Fusion, ASP, SQL
Network/System Maintenance	19	
Network Administration and Development	18	

Other Considerations in Responding to Employer Computer Skill Needs

Given the commitment of the School and Workforce Partnership to promoting workforce development activities that prepare Bennington County workers for jobs that pay a family sustaining wage, it is important to consider both the opportunities for local workers to enter and advance in Information Sector and IT occupation employment, and the wages they can expect to receive in these fields.

Moving in and Moving Up -- How Workers Enter and Advance in Information Sector Businesses and IT occupations

In both Printing & Publishing and Information Technology sectors, there are a wide variety of entry-level opportunities.[7] In Printing & Publishing, all but one of the companies interviewed had entry-level opportunities. The range of opportunities was impressive:

Receptionists/Front Office Clerks
Data Entry
Sales
Pagination
Shipping and Receiving Clerks
Graphic Artists
Reporters
First Level Circulation Manager
Customer Service Representatives
Press Operators
Bindery Operators
Maintenance Mechanics
Material Handlers
Accounts Payable/Receivable Clerks

There were also clearly identified career ladders associated with some of these entry-level positions. For example reporters may move up to become assistance editors, desk editors, and managing editors. Entry-level sales people can move up in the sales managerial hierarchy.

In addition, however, a number of Printing & Publishing employers noted the opportunities for less specialized entry level workers to make lateral moves into more specialized parts of the business as they came to know the industry and acquire the skills associated with occupational categories specific to the publishing industry. An employee hired in pagination could acquire the necessary skills and move into the graphic arts/publication layout division. An administrative assistant could become a entry level circulation manager.

Similarly, among Information Technology companies, there were a wide variety of entry-level positions:

Office/Clerical Assistants
Customer Service Associates
Sales
Programmers
Web designers
Software Testers
Technical Support
Documentation

[7] In our conversations with employers, we defined entry level positions as those for which the employer might hire someone with no previous work experience in the industry -- someone fresh out of high school, a technical education program, or higher education.

Some of these positions have clear, traditional career ladders. An entry level programmer can become a senior programmer, and eventually move into more exclusively program design and project management functions. A customer service associate can become a supervisor and then a department manager.

As in Printing & Publishing, however, there also seems to be ample opportunity for lateral moves, as new, less technically skilled employees gain knowledge of more advanced technical skills. A sales person can take an interest and become a programmer. Alternatively "technical" employees can move into business functions. In one company we spoke with, a senior tech support person was transitioning into sales.

In both Printing & Publishing and Information Technology companies, there was little mention of formal computer training or education as the key to making these transitions. Rather, employees picked up skills on the job, and through mentoring by other employees.

In the Financial Services sector, there was little diversity in the entry-level opportunities. In commercial banking, employees without experience entered as tellers, customer service representatives, or office assistants and, in other financial services companies, as data entry staff, receptionists, and support clerks.

In commercial banking there were opportunities for advancement. A teller could become a lender, and perhaps a branch manager. Again, this depended mostly on banking experiences rather than technology skills. In other companies, an administrative assistant might become an investment associate and perhaps a portfolio manager, but this would be contingent upon receipt of a college degree.

Among other major employers, entry-level positions are career paths were varied and industry specific. Many career paths depended on the acquisition of supervisory and managerial skills, and/or increasing experience with the company's products and business.

IT occupations within Other Major Employers tend to function much like IT occupations in the IT sector. Increasing technical competency through on-the job experience can lead to expansions of responsibility. One interesting difference, however, is that Other Major Employers tend to rely on IT certifications and credentials for hiring more than IT companies do.

Degrees and Certifications

We inquired about the degrees and certifications required or desired when hiring new employees for positions that require the use of a computer. In developing our plan to address employers' needs for workers with computer skills, it is important for us to understand the types of credentials they have come to expect in new employees. For the workforce developments system to function effectively, training and education providers, and employers must be in step with each other in terms of the importance and meaning of degrees and certifications.

Nearly all level 1, data entry-type jobs require only a high school diploma or the equivalent. One employer did report a position that required only data entry-type computer skills, but also

required a bachelor's degree. However, the college education was necessary for the employee's understanding of financial concepts, not computer knowledge. Only one employer mentioned a specific interest in potential employees for data entry-type jobs who had taken courses in Word and Excel. One other employer reported that although only a high school diploma was required for three of the data entry-type jobs in the company at present, in the future the employers would like to require Microsoft Office Users Systems (MOUS) certification.

Overall, then, employers seem content to hire employees for data-entry types jobs who have little understanding or capacity to work with computers. Most employers appear to anticipate that data entry types jobs will remain technologically rudimentary and that employees, over time, will not need to be capable of or prepared for more sophisticated use of computer technology.

At level 2, jobs that require strong MS Office skills, the required degrees and certifications vary widely depending on the type of position. Thirty-nine of the 75 job categories have as their minimum degree requirement a high school diploma, 10 job categories require an associates degree, and 26 require a minimum of a bachelor's degree. The degree requirement mentioned by employers are linked to business content; employers look for employees with degrees or certifications in specific fields related to their business (e.g. finance, journalism, accounting, engineering) rather than in computer applications or computer science. The exception here is in some of the IT companies, where their respective field *is* computer science. Surprisingly, no employer mentioned Microsoft Office User Specialist certification as a requirement for a level 2 job. This underscores our findings from our job shadows that employers are less interested in employees ability to navigate through the functionalities of the MS Office software than in their ability to use capabilities of the software to manipulate and analyze information to address business problems.

For level 2 workers, IT companies are much more likely to require bachelor's degrees than are other information sector businesses, or other major employers. In the Printing and Publishing and Financial Services sectors, about 20% of the level 2 jobs required bachelor's degrees. Thirty-eight percent of the level two jobs at other major employers required a college degree. At IT firms however, 66% of the level 2 jobs required a college degree. Recall, these are not the highly technical "programmer" positions, but rather the positions responsible for the business functions of the firms such as account managers, customer service representatives, marketing/sales people, finance managers etc. This difference may suggest the need to train individuals with varied levels of basic education in MS Office software to meet the varied demands of employers, and/or to work with employers (particularly those in the IT industry) to see if certain of the level 2 type jobs may be opened to individuals with strong analytic and computer skills, who do not hold a four-year degree.

At level 3, nearly half of all the job categories reported (16 of 36) required a Bachelor's degree in a field related to the business. Another 16 job categories have as their minimum requirement only a high school diploma or some kind of experience in the field. Surprisingly, for a category defined by the use of industry specific software, no job categories require that an employee gain certification in a specific software application. The two job categories that do require an additional professional certification (one in printing and publishing and one in manufacturing) are highly conceptual and not related specifically to computer skills and knowledge.

As in the positions described in level 2, the marked division between job categories requiring Bachelor's degrees and those requiring a high school diploma is not related to computer skills, but to the other knowledge required of the position; this is especially true of financial services businesses. Once employees are hired and placed within the company hierarchy, they learn the industry specific software to the extent required for their positions. Because training in this type of software tends to be necessary as people are hired, employers tend to train "in-house" in small groups or one-on-one, rather than seek out a more traditional course structure.

There is, of course, an exception to the rule in positions in which a significant portion of a college education would be spent learning industry specific software. For example, an engineer might take several courses in which she/he used AutoCAD or a graphic artist might do much of his/her coursework in Photoshop. The distinction here is that the software knowledge and the conceptual knowledge of the career are intertwined, whereas a lending officer in a bank brings with him/her a knowledge of finance but would then need to learn the specific banking software used by the employer.

Level 4 demonstrates a split in degree/certification requirements based on where a person works and his/her specific position within that company. For example, some employers state that programmers are hired based on their experience and not based on any particular degree or certification; this is particularly true of some of the smaller IT companies who work in web development, software development and data processing. However, some employers, particularly some of the large other major employers focused on manufacturing and e-commerce, require that these programmers have a BS in computer science. The general sentiment from many of these employers (especially the smaller IT companies) is that MS/CISCO/SQL certifications are helpful but not essential. Only four of the 14 job categories in level 4 required certifications (in Windows NT 2000 & CISCO, SQL, Microsoft Certified Application Developer (MCAD), or Dreamweaver).

At levels 5/6, we see a trend toward certification, especially among the "other" major employers. Of the 14 reported job categories, 4 required some form of certification (Microsoft Windows NT or Windows 2000, A+, or Network +) and 4 required a degree in computer science. Even employers who did not require certification implied that advanced coursework or certification would be helpful in a prospective employee.

However, in many cases businesses do not hire a full-time systems administrator or technical support employee. Rather, they tend to seek the assistance of a consultant when a problem arises or rely upon the skills of a current employee with some degree of computer/technical knowledge. So, while a certification or degree seems essential for someone actively seeking a career in network/systems administration or computer technical support, there is also a large contingent of self-taught individuals who perform level 5/6 systems-network administration and technical support functions within their companies.

At level 7, again the response from employers is split between seeking employees who are "self-taught" and those who have obtained skills through a more traditional training program. Two jobs at level 7 require a Bachelor's degree, 1 required an Associate's, and 2 required "experience

and skills." While the skills necessary for software design and development are certainly fostered in a structured program, it does seem that it is possible for someone coming from another background with a strong knowledge of computer and software operations can also fill these types of positions, or perhaps more commonly, start their own businesses in these fields. The "self-taught" individuals working at this level, are working as proprietors of their own businesses or as one of two or three employees.

In sum, relatively few employers are currently concerned with finding employees with specific computer-related certifications. The exception to this is among employers seeking systems and network administrators, where certifications are more likely to be recognized by the employers.

For work at most other levels, employers are more concerned with experience and ability, and have not latched on to any particular certification as a suitable guarantee of competency.

Finally, the IT sector tends to be more degree conscious than other information sector businesses or other major employers for a wider range of positions. IT employers are more likely to look for college graduates for both their technical and non-technical positions. (An exception to this exists in the small IT startups begun by self-taught individuals.)

In designing an intervention to meet workforce development needs in the Information Sector and for IT professionals in other sectors, the challenges will be ensuring the ***quality*** of applicants' computer skills, rather than, say, expanding the availability of applicants with particular widely-recognized certifications.

Wages and Benefits

The following table details the average entry level and maximum salaries for each industry and computer skill level among employers interviewed for the report.[8] For all but the lowest skill level, ***starting*** salaries in Financial Services and Information Technology sectors compare favorably with the ***average*** annual earning of Bennington County employees -- which were $25,457 in 2000. Workers with technology skills fare less well in the Printing & Publishing industry.

[8] All averages have been weighted to account for the differing number of employees in each job category at different firms.

Table 9
Average Salaries

	Starting Salary	Maximum Salary
Level 1		
Information Sector	$18,999.32	$31,210.99
Printing and Publishing	$18,667.36	$31,871.54
Financial Services	$19,353.71	$31,010.03
Information Technology	$19,552.00	$21,640.32
Other Major Employers	$20,676.47	$31,203.36
Level 2		
Information Sector	$25,092.76	$38,998.29
Printing and Publishing	$21,880.34	$31,582.59
Financial Services	$28,062.50	$48,687.25
Information Technology	$43,232.00	$65,996.00
Other Major Employers	$26,341.59	$59,815.23
Level 3		
Information Sector	$25,771.97	$40,448.21
Printing and Publishing	$18,670.99	$25,917.90
Financial Services	$50,222.22	$93,666.67
Information Technology	$40,000.00	$60,000.00
Other Major Employers	$26,989.06	$62,057.57
Level 4		
Information Sector	$26,943.87	$59,170.39
Printing and Publishing	$31,470.40	$45,760.00
Financial Services	--	--
Information Technology	$26,823.16	$59,528.00
Other Major Employers	$38,287.50	$51,341.18

Level 5/6		
Information Sector	$29,577.36	$50,356.05
Printing and Publishing	$20,800.00	$33,280.00
Financial Services	$32,000.00	$50,000.00
Information Technology	$33,638.71	$59,238.40
Other Major Employers	$30,000.00	$49,000.00
Level 7		
Information Sector	$24,960.00	$35,360.00
Printing and Publishing	--	--
Financial Services	--	--
Information Technology	$24,960.00	$35,360.00
Other Major Employers	--	--

Of course, salary is not the only measurement of worker compensation. Part of our interviews with our sample businesses included a discussion of the benefits offered to full time employees.

Of the 33 businesses in our sample who responded to our benefits questions, 30 reported offering health insurance to their full time employees (above the state average of 75%), 19 provide dental (above the state average of 40%), and 20 provide life insurance (above the state average of 43%).[9]

Educational benefits are provided at 81% of the businesses in our sample. This usually takes the form of in-house training or compensation for training workshops and seminars. In some cases, the cost of college courses is reimbursed to employees, but, according to the employers, this benefit is rarely utilized.

Some form of retirement planning is available at 25 of the 33 businesses in our sample. Thirteen of those offering retirement benefits also offer an employer contribution to the plan. Most companies reported offering a 401K; additional retirement benefits that are offered by businesses in our sample include stock options, profit sharing, IRAs, S.E.P.P., bonuses, and pension plans.

[9] Statewide estimates from the 2000 Fringe Benefit Survey, Vermont Department of Employment and Training.