

Overview

In addition to rating their personal level of proficiency on 126 skills associated with IT work, New York State IT employees also rated their need for training in each skill. Respondents reported whether they needed training in each skill and, if so, at what level. Choices included basic, intermediate, and advanced training levels. Overall, the greatest demand for training occurs among management skills, followed by skills associated with the Web and with security functions. Strong demand is also present for skills associated with system design and development and networking. Lesser demand is present for information analysis skills followed by operations support and mainframe-oriented technologies. Among the top 25 skills for training demand, eleven are general management skills.

There is little difference among patterns of training demand associated with agency size, grade level or education. As would be expected, different grade levels tend to have different demands for the number and type of skills. The different specialty areas tended to align their training needs with the skills associated with their specialties.

Assessing training demand

After rating their level of proficiency for the skills in the survey, respondents were asked if they needed training in these same skills in order to do their jobs. If they said yes, then they were asked to select the level of training needed. The choices were none, basic, intermediate, and advanced.

As with the proficiency rating scores, several variables influence training demand. One of them is grade level. More senior technology professionals often have basic proficiency in key skills and need higher level training to advance their capabilities. Conversely, managers may not need highly technical training but instead need training that imparts conceptual knowledge about various topics. Job specialty has an influence as well. Those who specialize in a given area need higher level training in certain skills. At the same time, people in any one specialty may need basic knowledge about skills in other specialties in order to understand how the work they do fits with work done by others. In addition, training demand can vary according to the history, size, and mission of an individual's organization. For all these reasons, the size and distribution of training demand varies considerably from one skill, or organization, or job type to another.

Table 7 illustrates the general training demand data for individual skills. It shows the ten technical skills with the highest training demand as measured by the total number of employees who say they need training at any level (Table E6 in Appendix E presents similar data for all skills in the survey listed in alphabetical order).

Table 7. Top ten technical skills by level of training demand

Training Demand

Skill	N*	None	Basic	Intermediate	Advanced	Percent who need training at any level
System security applications	2,696	1,418 (53%)	445 (17%)	546 (20%)	287 (11%)	47%
Website design & development	2,708	1435 (53%)	440 (16%)	503 (19%)	330 (12%)	47 %
Disaster recovery & planning	2,681	1,460 (55%)	411 (15%)	508 (19%)	302 (11%)	46 %
Intrusion detection	2,687	1,467 (55%)	487 (18%)	471 (18%)	262 (10%)	45%
Website management	2,678	1469 (55%)	468 (18%)	447 (17%)	294 (11%)	45%
Identity management & directory services	2,651	1490 (56%)	448 (17%)	448 (17%)	265 (10%)	44%
Encryption	2,662	1506 (57%)	494 (19%)	428 (16%)	234 (9%)	43 %
Web/IP	2,665	1514 (57%)	370 (14%)	480 (18%)	301 (11%)	43 %
Web servers	2,643	1506 (57%)	501 (19%)	389 (15%)	247 (9%)	43 %
Network configuration	2,665	1532 (58%)	345 (13%)	478 (18%)	310 (12%)	43 %

* Row totals may not equal 100 percent due to rounding

The highest levels of training demand are concentrated in basic or immediate level training. For example, many employees want to know something about a specialized skill like encryption, but do not express a need for advanced training in the subject. For a newer technology like web servers, more employees requested basic training than intermediate or advanced. On the other hand, figures for many of the general management skills and IT management skills show that the majority of employees want advanced training and few want basic or intermediate levels. This is consistent with the generally higher levels of existing proficiency reported for management skills.

Overall patterns of training demand

In general, New York's IT employees express high training needs. On average, employees reported a need for training in 42 skills, comprising a mixture of general professional and management skills, broad IT concepts, and specific techniques or tools.

General patterns show that employees seek training at the next higher level of skill beyond their current proficiency. In responses to the open-ended question, many employees commented on the need for continuous training in their specialties as well as conceptual training in a variety of topics. They often pointed out that the rapid pace of technological change requires ongoing training to keep their core skills up to date. Many also cited the importance of having general familiarity with a variety of areas outside their own specialties in order to do a good job of contributing their particular expertise to larger efforts that combine skills and technologies from several specialty areas.

Every skill in the survey was selected for training by at least some employees. The highest training needs were expressed for management skills with project management (48 percent), leadership (48 percent), and supervisory

skills (48 percent) as the top three. Negotiation and conflict resolution (48 percent) and planning and evaluation (47 percent) were also in the top ten. Of the top 25 skills by number of employees who say they need training, eleven are management skills. Among the technical skills, system security applications (47 percent), website design and development (47 percent) and disaster recovery and planning (46 percent) ranked as the top three. Intrusion detection and website management were also among the top ten.

Training demand by job specialty

As with proficiency ratings, training demand is strongly influenced by job specialty. Across all specialties, relatively high levels of demand (by one-third or more of employees) were reported for roughly 25-40 individual skills. Table 8 lists the top ten skills for which respondents reported high training demand as measured by the proportion of employees in the specialty who said they need training in these skills.

In all specialty areas, employees reported a need for training in a mixture of management and technical skills. Among the management skills, negotiation and conflict resolution, project management, leadership, and supervisory skills are in the top ten for most job specialties. As would be expected, technical skills in the top ten vary considerably from one specialty to another, although system security applications appear in four of the eight specialty areas.

Table 8. Top ten skills for training demand by job specialties

Technology managers	Database specialists	Data communications & telecommunications specialists	Operations specialists
<ul style="list-style-type: none"> IT strategic planning Business continuity planning Negotiation & conflict resolution IT risk assessment & management Contract management & vendor relations IT project portfolio management IT procurement IT asset management Leadership Capacity management 	<ul style="list-style-type: none"> Java Oracle Leadership Data warehousing Supervisory skills Project management Negotiation & conflict resolution Oral communication Disaster recovery & planning Website design & development 	<ul style="list-style-type: none"> Supervisory skills Network configuration Wireless technologies Project management Network architecture & design principles System security applications Intrusion detection Wide Area Networks (WAN) Firewalls Leadership 	<ul style="list-style-type: none"> UNIX Windows operating system Leadership Supervisory skills Oral communication Written communication Disaster recovery & planning Negotiation & conflict resolution Backup & recovery Principles of operating systems
Programmer	Other technical specialists	Business specialists	Systems specialists
<ul style="list-style-type: none"> Website design & development Website management Project management Java Supervisory skills Leadership System security applications Negotiation & conflict resolution Web servers Website accessibility 	<ul style="list-style-type: none"> Intrusion detection Windows network operating systems Network configuration Wireless technologies Backup & recovery Microsoft Access Support for desktop applications Web/IP Encryption Hardware maintenance & support 	<ul style="list-style-type: none"> Website design & development System security applications Supervisory skills Web/IP Leadership Negotiation & conflict resolution Website management Planning & evaluation Intrusion detection Project management 	<ul style="list-style-type: none"> Linux operating systems Negotiation & conflict resolution Web/IP Windows operating system System security applications Project management Network architecture & design principles Identity management & directory services Leadership Network configuration

Training demand by grade level, age, and size of agency IT staff

Entry level employees on average reported a need for more training than employees in other grade levels, with an average of 49 skills. Journey level staff and middle level managers both average around 35 skills, while upper management reported training needs for an average of 23 skills.

Respondents in all grade levels said they need training in management skills. Middle level managers expressed a need training in both general management skills (such as project management and leadership) and IT management skills (such as IT strategic planning and risk assessment), while upper level managers concentrated more on the IT management skills. Entry, journey and middle management levels all said they need training in security. Entry level staff reported a need for the broadest range of training, including security, databases, system development, and networking topics, as well as management skills. Journey level respondents predominately focused on more general management, web-related, and security training. Middle managers were the only group to express high need for the management and use of information as an asset (e.g., knowledge management and

Training Demand

workflow management).

We found no age-related differences in training demand. Younger (39 and younger) and older (40 and older) employees both say they need training in similar sets of skills. In addition, no significant differences appeared among small, medium, and large agencies with respect to the pattern of training demand.
