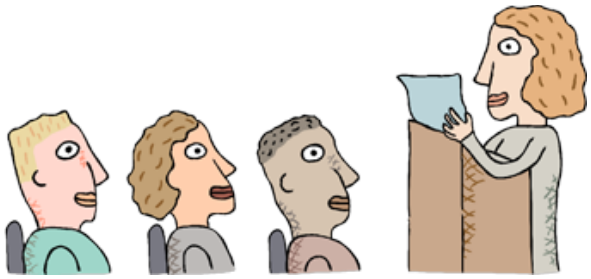
Organizational Level Training

Organizational level training is the training required to develop the software engineering staff with the skills required to support projected new business. To accomplish these strategic skills building you must:

- Define the strategic business objectives
- Derive the software engineering and support skills required from the business objectives
- Assess the current composite skill set of the work force
- Compare the available skills to projected skill requirements
- Identify the needs
- Determine the gaps
- Identify programs and activities employees can use to meet the needs and fill the gaps

This aspect of skills building is not focused on a specific program, but rather on the direction of the business. More time, usually a year or more, is available to develop these identified skills.



Typical corporations develop a three to five year forward looking strategic business plans and update this strategic plan each year. This plan includes costs associated with training personnel. The process begins about six (6) months prior to start of corporate fiscal year (FY) to ensure you have corporate approval by the start of the new FY. Using a process similar to the following:

In Phase 1, the team:

- Analyzes, reviews, and approves current and future business markets
- Prepares materials to describe the current and future business; market trends; projected customers; key programs for the next year; technology challenges and needs; strategies for new business; and project awards, sales, bid and proposal (B&P), capital, and independent research and development (IR&D) for the following year
- Obtains approval for Phase 1

Following approval of Phase 1, begin Phase 2 which:

- Addresses affordability issues by evaluating the budget, overhead rates, and G&A rates
- Attempts to balance the new business objectives with the costs
- Iterates as needed until management is satisfied with the new business objectives and associated costs

A multi-year technology plan is a by-product of this process. The technology plan then provides information to help you derive the strategic software skills objectives.

Many organizations use a **skills inventory database** to store, maintain, and report skills. A skills inventory questionnaire is given to new members of the department for initial input and is often part of the orientation package. For the rest of the department, the skills data is updated yearly, commonly

coincident with the performance evaluation. If an employee's resume is used in proposals, then that employee may be asked to update the skills database even more frequently. The managers and supervisors assess department skills using database queries. The types of information collected may include professional memberships; formal education; programming languages; COTS software and hardware product expertise; proposal skills; standards such as CMMI®, INCOSE, ISO, IEEE, EIA; protocols; programs; and computer aided software engineering (CASE) tools such as Rational Suite, DOORS, and Troux Architect. Employees are generally asked to self-assess their experience in these areas, for example, that they are at a novice, intermediate, or practitioner level; the employee may also ask their interest in working on the various skills.

Organizational skills can also be improved by allowing **mobility among the departments** and project areas. Since a matrixed software engineering organization is required to support a variety of concurrent and distinct programs, allowing employees to work on different programs or projects helps build the expertise within the organization. If personnel are allowed and encouraged to move between programs, this environment builds both breadth and depth in the department and creates an environment that is conducive to long-term skills building. Company policy must support this activity by posting the requisitions for available positions and ensuring that the managers support it.

One way to implement mobility within the organization is to hold a Project Preference Voting meeting. Typically this occurs at least once per year or more often when there is new business. The one hour to one day meeting describes all the projects and addresses questions. Most organizations hand out a summary of projects and voting forms allowing employees to vote if they want to work on one of the projects. Usually the rotation is six to 12 months and is not intended to preclude other means of seeking inter-project transfers. It should not cause excessive movement, but rather allow movement of personnel, which is coordinated with program or project management office. The supervisor, current team leader, and future team leader need to sign off on the employee rotation.

Communities of Practice (CoP) are a current trend within engineering organizations. CoPs are established to ensure that members of the organization obtain or maintain knowledge or technical proficiency in software related areas of interest to them and pertinent to current and projected business. The objectives of a CoP are to:

- Ensure that there is someone in the organization to provide information, expertise, help, and support in the major areas in which we are involved;
- Maintain a store of information, readily available to others in the organization;
- Provide proposal support, give presentations to customers, and support training;

- Attend relevant conferences, seminars, and user group meetings and be the software department representative;
- Take courses and training related to specific technology areas;
- Publish papers and contribute to corporate and department news publications.

Examples of CoPs are metrics, COTS integration, J2EE, CORBA, programming languages such as C# or JAVA, and the CMMI®. CoPs can be established for almost any area where the organization or the personnel have an interest.

Almost all companies have a **tuition reimbursement program** available to full-time employees. After assessing the strategic business objectives and determining the software engineering skill requirements trend, employees are notified so they may target their academic coursework to coincide with future trends. For example, some organizations only pay for advanced engineering degrees but if the company trends it towards business, it may approve and pay for employees who want to earn a MBA degree.

The organization may also provide internal **standards and practices training** to ensure that all personnel involved with the development of software are familiar with the company specific standards and practices. This training is based on the company standards and practices manual that is developed by and for the software organization. The Software Engineering Project Group (SEPG) should direct this activity.

Software Engineering Standards and Practices Manual (SESPM) Training may include topics on structuring the organization, estimating and managing the cost and schedule, planning a project, staffing the team, assessing and controlling risks, collecting and analyzing metrics, improving processes, evaluating performance, and building skills and teams. The training is similar to the outline for this course and can be taught over several weeks during lunch hour sessions or after work to minimize cost and it should be repeated on a quarterly basis. Senior software personnel should teach the course within the software organization.

Project Specific Training

Project specific training is needed to ensure that engineering and support personnel are prepared for the project. It must address specific aspects of the project such as the methodology, the process model, computer hardware, programming language, CASE tools, operating system, and the target environment COTS software. Some project specific training is inevitable, but you can attempt to minimize project specific training by:

- Standardizing the overall software process;
- Anticipating the programming language, operating system, and COTS products preferred by your customers;
- Standardizing the CASE environment.