Success Factors and Implementation Strategies for Process Improvement Teams

Kim A. Randall
Department of Defense Education Activity, kim_randall@odedodea.edu

Eugene G. McGuire
American University, mcguire@american.edu

Follow this and additional works at: http://aisel.aisnet.org/amcis1997

Recommended Citation
AMCIS 1997 Proceedings. 252.
http://aisel.aisnet.org/amcis1997/252

This material is brought to you by the Americas Conference on Information Systems (AMCIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in AMCIS 1997 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.
Teams can be created for the purpose of continuous improvement any level in the organization. For these teams to be successful, however, they require clear identification of their mission and agenda, facilitation for effective team development, and guidelines concerning improvement areas and implementation plans. Mohrman et al (1995) notes that the primary focus of improvement teams within an organization should not be on transforming core processes but instead on improving the organization's current capability to deliver products and services. These teams typically focus on issues such as quality improvement of chronic problems, redesigning existing processes to better meet market demands, and solving new problems as they develop (Mohrman et al, 1995). Clearly these issues can overlap and all can be addressed by one team. This is often the situation for software process improvement teams, whether they be at a development level within an individual project or at an organizational level as typified by a Software Engineering Process Group (SEPG) or a similar group.

For example, most software development organizations find that the high cost associated with discovering and fixing software defects late in the project life cycle is a chronic problem that can be initially addressed by increased focus on the testing process. It is unlikely, however, that improving testing will be an entirely adequate solution to excessive software defects. Redesigning the software development process is usually necessary to insure such things as requirements traceability and formal peer reviews of design and code. Further complications such as the demand for reduced cycle time can compel the improvement team to develop innovative solutions for new problems, i.e. increased overall quality in less time.

This paper presents success factors and implementation strategies that can be practical and useful for process improvement teams in software development organizations. Observations and conclusions in this paper are primarily drawn from research on organizations that have initiated software process improvement initiatives (McGuire 1996a; 1997).

Process Focus

Organizations with a process focus work to prevent crises from occurring instead of reacting to them after they occur. User satisfaction is actively monitored and the quality of the process is quantitatively measured so all aspects of the process can be continuously improved. As the focus on process and process maturity increases, institutionalization of organizational processes is achieved via policies, standards, and organizational structure. Individual approaches to problem solving are integrated into the process focus rather than used instead of a process focus.

A software process movement emerged in the mid-1980s when shortcomings in managing software development processes were recognized as impediments to improving software reliability and quality. One model of software process maturity that has received considerable attention is the Capability Maturity Model (CMM) developed by the Software Engineering Institute (SEI) at Carnegie Mellon University in Pittsburgh (Paulk et al, 1993). The assessment methodology associated with the CMM includes an implicit model of the software design and
development process at five defined levels of maturity, a questionnaire, and procedures for conducting software process maturity assessments in organizations. The maturity framework underlying the CMM applies quality management practices to the process of software development. A major theme of the CMM's maturity framework is that a software activity can be improved if the same activity can be predictably repeated. This philosophy pertains to all the people, processes, and technologies that comprise the software activity.

**Quality Focus**

One of the most important issues affecting the software development profession is that of quality. Over the past twenty years there have been thousands of articles addressing the issues of quality. However, views about quality have been shaped to a considerable degree by five major writers: Crosby, Deming, Feigenbaum, Juran, and Taguchi. Crosby's (1979) views of quality may be expressed by three concepts: the notion of "zero defects;" the definition of quality as "conformance to requirements;" and the view that quality is assured by a highly structured, step-by-step program focused on improving quality.

Deming (1986), arguably the most influential proponent of quality, stresses two major ideas: a general, 14 point program of quality improvement guidelines; and the idea that processes are subject to variation, that statistical measurement can be used to determine if a process is in control, and that the emphasis should be on minimizing variation in the process. Feigenbaum (1983) first coined the term "total quality control in 1951 and takes an engineering approach to managing quality wherein he defines four stages for quality-control activities: new-design control; incoming-material control; product control; and special process studies.

Juran (1979), similar to Crosby, defines quality as "fitness for use." Juran points out that much effort can be wasted on controlling quality if one attempts to control all factors. Instead he points out that there are a "vital few" factors to address and that the remainder are the "trivial many" which can consume much effort but contribute little to the ultimate quality of a product or service. Taguchi (1989) argues that a total life cycle cost enables a designer to see the societal loss over the product's lifetime and that this loss function can be minimized by the proper selection of design parameters.

**Team Orientation**

This is perhaps the most commonly cited characteristic of successful process and quality environments. A team orientation is often necessary throughout an organization when reengineering efforts cross functional and disciplinary boundaries. Ramifications of this structural change includes requiring that employees not adopt or retain insulated work modes but instead develop business, managerial, and political skills to successfully negotiate with multiple constituencies and integrate their work and decision making with the strategic plans of the organization. Increasingly effective teams have to be interdisciplinary and cross functional because they have to know the tasks of others and can provide backup and feedback capabilities to other members of their team and related teams.

Team attributes include such factors as the composition of the team, whether contributors are dedicated, whether team members are colocated, the reporting relationships of team members, how often meetings are held, etc. Multiteam linkages may be established to handle interdependencies among teams and across the organization. In knowledge work settings, it has been shown that teams are generally not self-contained. Both team attributes and multiteam linkages are structural responses that must fit with the task, and both contribute equally to
performance facilitators and effectiveness. There is often a considerable emphasis placed on training and education in the transition phase to a team-based organization. Empowerment of teams requires that they receive direction and have the capability to make a difference in the attainment of goals.

Supportive Change Management

Change management strategies must be utilized from the beginning of a process improvement effort to first anticipate possible causes of resistance to the change and then to have strategies in place to overcome individual and group resistance. Benefits of the change must be clearly articulated and reward systems implemented that recognize the shift from individual effort to team and process-driven effort. Barriers that inhibit the change from successfully occurring must be removed. Management may find it appropriate to adopt a coaching and facilitating style instead of a command and control style in dealing with employees when change is occurring. If so, management needs to be trained in this area. Kotter (1995) notes eight steps to organizational transformation support that are appropriate to process improvement efforts.

Change Model

It is useful to frame change management strategies in a model. Many such models are available. One widely applicable model developed by Stokes (1991) entails seven steps: 1) external and/or internal pressures to change are perceived by the organization; 2) a vision for the future state is created, i.e., "conditions as we would like them to be"; 3) benefits of the change for people and for the organization are developed and made explicit; 4) key variables which will impact the change (e.g., peoples' previous experience with change in that organization) are determined and their impacts assessed; 5) reasons for possible resistance to the proposed change (based on analysis of key variables) are determined and ways to deal with the resistance are planned; 6) strategies for introducing and managing the change are designed and implemented. These will range from highly directive to less directive and will include varying degrees of participation. In all cases, the strategies should help create movement toward the desired conditions, be based upon the key variables and their impacts, be consistent with the ways in which the organization plans to overcome resistance, and be congruent with issues of use of power, speed, and leadership style and organizational norms regarding involvement, clarity of crisis, likely resistance, etc.; 7) post change followup, reinforcement and support to help solidify the change and prepare people for further ongoing changes.

One of the greatest challenges a new vision faces is in altering "psychological contracts" which are already in place between the employee and management. If employees believe that the proposed change will cost more than it will gain (in terms of time, money, prestige, security, etc.) they may oppose and try to undermine the change. Stokes (1991) suggests the following implementation strategy to effectively deal with change as typified by process improvement efforts.

Environment Stabilization

Change management strategies should help people maintain or regain stability in the face of the current change. Change management strategies, therefore, should include the following areas: Organizational Context (e.g., clear mission and shared vision, supportive culture, rewards consistent with objectives, information and feedback); Group Structure (e.g., clear goals, clearly defined roles, appropriate group membership, effective group culture); Group Process (e.g., problem solving, decision making, conflict management, communication, boundary
management); and Group Effectiveness (e.g., service that meets or exceeds performance standards, meeting team members' needs).

**Learning Organization**

Many organizations are realizing that continual learning patterns must become institutionalized for that organization to achieve maximum use of people and remain competitive. This learning is not achieved simply through training and education opportunities for people although these are important, particularly if they promote substantive professional development. Learning organizations as defined by Senge (1990) and others are more than this however. These organizations work hard at facilitating systems thinking (seeing the organization as a whole); enhancing existing mental models of existing processes and procedures (thinking outside the box); and team learning (where collaboration and group success are the norms). These characteristics can serve as useful guidelines for organizations as they establish change management strategies.

**Integrative Strategic Alignment**

The goals, objectives, values, beliefs, and actions of the organization, management, teams and work units, and individuals should be kept in alignment throughout a process improvement effort. Too often one or more of these areas suffers as the change effort in instituted. All organizations should carefully consider how they are going to manage IT-related change. They will not succeed by implementing pilot projects that are governed by a different set of norms and expectations that those applied to standard operations in the organization. They will not succeed by placing their primary focus in change efforts on technical and logistical issues at the expense of people and organizational change issues. They will succeed if they take a more systems-oriented approach that deeply considers the areas discussed above in this analysis. They need to develop strong organizational mechanisms that facilitate the adoption of new technology and processes and enhance the roles and responsibilities of the IT professionals, staff, and line managers in the implementation of technology-related change.

**Conclusion**

Common change efforts such as process improvement initiatives are often performed ad hoc as if they were outside normal project planning guidelines. This is a common mistake. There are many project methodologies in use today that can be applied to the task requirements of change efforts with steps such as: 1) define project scope; 2) plan the project; 3) assess requirements; 4) design: describe the system in detail; 5) select or develop solution; 6) implement solution; 7) evaluate results; and 8) institutionalize results. During each phase of this methodology, specific issues of job performance, work process, business/management control, and technology design are considered. In addition, change efforts can and should be measured. It is difficult to quantify any progress toward a goal without some kind of yardstick, or measurement, that describes success. Even if there is a measurement, what often appears to be missing, however, is a translation of this statistic into terms that express business value to the organization. What does this statistic mean in relationship to the goals and objectives of the business? How does it affect the organization's competitive stance? Measurements must be more than abstractions, they must be meaningful to the people close to them.
Finally, organizational management should become proficient in change facilitation skills such as: total quality management tools and philosophies; understanding and guiding organizational change; leading and facilitating teams; team development and dynamics; individual style assessments; conflict management; decision-making skills; facilitator intervention; team problem-solving; creative problem-solving; meeting management; listening skills; and understanding and working with dysfunctional behaviors.

Successfully implementing process improvement efforts requires attention to many organizational, people, process, quality, and methodological factors. The factors discussed in this paper are directly applicable to technical environments where software professionals are facing increasing demands for higher quality with reduced cycle time to meet global competition.

References available upon request from first author.