How to Make Friends with Upper Management and Influence Process Change

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1 INTRODUCTION

Change is inevitable. With the continuing advances in technology, development tools and the requirement to improve performance, testing is more complex and difficult. The ever-increasing rate of complexity and delivery of products is too fast for testing to keep pace. To meet the demand, test organizations must deal with frequent changes to process, strategy, methodology, and techniques. A test organization's ability to effectively implement change is dependent upon developing and implementing a successful change strategy that incorporates the contributions of both people and process.

When the subject of change is brought up, the first two questions that always seem to be asked are:

1. "Why do we need to change?"
2. "How much will it cost?"

One must always be prepared to address both questions. Never answer question one with "because the way we are doing it doesn't work." This question should always be answered with concise rationale for change and anticipated benefits, backed by research data. Nor should you not be able to answer question two. Upper management will always ask the question of cost, and the estimated cost should be available.

Determining the need to change is sometimes difficult. Other times it is obvious. Some reasons for change may include any of the following:

Reasons for Improvement	**Reasons for Avoidance**
Establish a standardized approach	Eliminate redundancy
More comprehensive test designs	Reduce ad hoc testing
More test case reusability	Falling behind technological advances
Better requirements tracking	Incomplete test designs
Reduced cycle times	Scalability issues
Better interface for test automation	
Easier test design reviews	
Prioritization of test case execution (risk assessment)	

One of the first requirements to be accomplished is to benchmark the current process and environment. In order to get from Point A to Point B, one must know where Point A resides. The next step is to determine where you want to go. Goals must be established to guide the organization along the way towards the desired end result, that is, where you would like the organization to be in the near future.

> ***"To improve an organization, it is helpful to have a clear picture of the ultimate goal and some way to gauge progress along the way."***
>
> - **Watts Humphrey**

After concluding a benchmark and establishing the desired goals, the necessity to improve the test organization must be communicated to the organization. The message needs to be delivered both up to upper management and down throughout the test organization. It is vital that the initial announcement include the benefits of improving the test organization. The message must demonstrate the return on investment that could be achieved. The risks and rewards need to be clearly identified. Without these items, obtaining buy-in from upper management will be very difficult. However, with clearly defined goals that include expected return on investment, and acknowledged risks and rewards, upper management can become your best friend in your trek to test process improvement.

2 HOW TO GET STARTED

2.1 Know where you are

The key to getting started is to know where you are. By benchmarking, that is creating a baseline of your current process, you can determine where and to what extent your process needs to change. The baseline is nothing more than an assessment of your organization's process maturity level. There are several methods for creating a baseline. One example is the use of a questionnaire or survey for gathering the data needed to perform this assessment.

Keys to a successful assessment are:

- The questionnaire should be carefully developed keeping in mind the goal of process improvement. There are a number of resources for developing a survey or questionnaire. (Reference **Appendix B – Testing Survey** detailed in *Systematic Software Testing* book by Rick Craig and Stefan Jaskiel)
- Be careful to solicit input from experienced testers and those who interface with the test organization. Your audience should include key stakeholders in your process and those who will directly benefit from process improvements. You are looking for constructive feedback that will result in an accurate assessment.

2.2 Identify areas of improvement

Performing an inventory session is a very effective way to begin identifying areas of improvement. This session should be very informal and interactive so that all participants feel comfortable voicing their opinions. Keep in mind, there are no wrong answers during this session. This is not a debate but rather an important data gathering exercise.

Keys to a successful inventory session:

- It should be fun! Active participation is strongly encouraged. Emphasize to your audience that this is a chance to speak up and let your voice be heard.
- Before you begin, state your basic rules of conduct. Rules should include 1) All input is welcome and there are no wrong answers, 2) Participants should not interrupt or disrespect others. These rules are not intended to stifle your audience. Instead, you are working to set a positive tone, keep your session productive, and make sure everyone is involved.
- Choose a moderator to keep the pace of the session at a productive level. Also, designate a Scribe to document the input in the form of a fishbone diagram so that everyone can see the data as it is being collected.

2.3 Identify where you are going

At this point, you should have a good understanding of where you are and where you can improve. The next step is to determine where you want to go by defining your vision.

Keep in mind; your organization's needs are key for this phase of process change. More than likely, you will not be able to tackle every item on your list. Be realistic when developing your implementation plan. It can be implemented in phases based on your vision. Make sure that upper management understands the fact that overnight results are unrealistic and that process change is one of evolution and not revolution.

It is also important to remember your vision will evolve as you move forward. Priorities will change and your organization will change. It is up to you and your team to keep your plan in step with the goals of upper management.

3 DEVELOPING AN IMPLEMENTATION PLAN

After identifying the areas of improvement and the vision of the group (where you are going), a suitable implementation plan must be developed. This plan becomes an agreement, a map and a "measuring stick" for the test organization and upper management. The key to successful change is good planning.

3.1 Issues Grouping

Prior to developing the improvement plan, all of the collected data must be synthesized. Start by grouping similar issues obtained from fishbone diagrams, questionnaires, surveys, interviews, and any other input that has been collected. For example, group all test automation issues together. Once items and issues are grouped, filter out any non-essential items such as those with no foreseen return on investment or items that do not fit in with the vision. Prudence and sensitivity must be exercised when removing some issues from the list so as not to offend those who provided the data. Many people have a "pet-peeve" item in which they may have an emotional attachment. It may be necessary to clarify that some recorded issues, though realized problems, may not fit into the overall direction of the group's vision, and lack of time may not allow some items to be addressed immediately.

Upon completion of the issues grouping, each group must be prioritized. Prioritization strategies may be done in several ways. The choice of a priority strategy will be dictated by your vision and other factors, typically those directed by upper management. Below is a list of some suggested strategies:

- Critical areas first
- Quick ROI
- Cycle time reduction
- High external interface exposure (quick wins)
- Test Management and/or Automation
- Acceptance/Regression Testing
- Upper Management directives
- Any combination of above

After the prioritization is completed, the groups can be ordered by proposed implementation. Many items can be done in parallel. But it is important to understand that some items may have prerequisites that must be completed before other items can be started. For example, developing extensive automation for all of the testing should not be attempted until the development of the test cases has been formally controlled (Reference the **Test Maturity Matrix** detailed in *Test Process Improvement* book by Tim Koomen and Martin Pol). Priorities of some items may change due to the realization of the proposed implementation.

3.2 Formulate the Plan

Once all the issues have been grouped and a suitable priority strategy has been selected, it is time to write the Implementation Plan. As stated before, this Implementation Plan is an agreement, a map and a "measuring stick" for the test organization and upper management.

The plan organizes the details of your implementation strategy. The plan must be thorough and complete. The plan needs to specify the exact areas that are to be improved, why they need to be improved, how the improvement will take place, what personnel will be involved in the work, and what outcome is expected for each item in the prioritization strategy. Two key elements of the Implementation Plan are the benefits and the risks of the changes being proposed.

The benefits of the plan must first identify the costs that will be incurred in terms of time, resources, and dollars. The costs are then followed by the anticipated return on investment (ROI). Upper management must understand that change has an associated cost up front, but there will be returns on those investments. The ROI can be shown in two methods, quantitative benefits and qualitative benefits. The quantitative benefits are the most visible and will be what upper management is most interested in understanding. These are benefits that have a direct cost savings associated with it. For example, it could be a measurable percentage of reduced cycle times or reduced costs in capital expenditures. The qualitative benefits are harder to nail down. These are benefits that are realized, but difficult to measure initially. For example, going to a standardized approach to test case development has benefits, but how does one measure it prior to implementation? Nonetheless, these benefits should be identified and explained in the Implementation Plan.

The second key element of the Implementation Plan is the identified risks. No change comes without risks. They need to be carefully considered and clearly detailed. Each risk should be associated with a contingency plan should that risk be realized. Demonstrating to upper management that the risks have been well thought-out helps in selling the entire plan. Some risks that may be considered with most any improvement project are listed below:

- New tool purchases will initially hamper production (training/learning curve). The ROI comes later.
- Improvement will require dedicated resources and time usually requiring resources from the production area.
- Training on new processes, methodologies or tools require cost and time.
- Key team members have not bought into the improvement process.

Anticipate questions from upper management and have answers already imbedded within the plan. Also, some supplementary material can be prepared for anticipated questions not answered in the plan and used during the presentation.

3.3 Management Buy-in and Approval

Of all the actions taken to improve the testing process and methodology, none are more important than obtaining management buy-in and approval. And the first in the chain is your immediate

manager. Without buy-in from your immediate manager, you will most likely not succeed in any improvements.

After securing the buy-in from your immediate manager and the Implementation Plan is completed, set up a meeting with all the targeted upper management (the budget and policy decision makers). Choose a time when all of the targeted upper management personnel are available (It is best to have only one meeting). You want all of them in one room together so as to hear the same presentation, hear the same questions and answers, and take advantage of the synergy this one meeting can inspire. Use a presentation format such as Microsoft® PowerPoint®. Have several representatives from your team present to display solidarity. Be sure that all team members speak with one voice (keep any internal team disagreements out of this meeting, for dissention will cast pessimism and doubt on the effort). Additionally, stress that the changes will take time and not occur overnight (Stress evolution, not revolution).

In addition to the presentation, prepare and bring supplementary material to the meeting for support purposes. Anticipate any questions that upper management may ask, particularly financial questions. Have data available to support any assumptions and conclusions. Prepare a strategy to deal with any points in your presentation with which upper management may have an objection. However, you should never make up answers. If you do not know, state that you will get an answer to them as soon as possible. And finally, keep emphasizing the return on investment throughout the presentation.

3.4 Communicate the Plan Down

After upper management buy-in has been accomplished, it is important to communicate the improvement plans to all members of your test team. Set up regular meetings to keep the team informed of directions, decisions, and developments of the improvement progress. Provide sufficient details so as not to "spring" surprises on the team.

The next step is to obtain buy-in from the senior staff. Begin by involving the senior staff in the implementation of the changes. This will promote ownership in the change process. Ownership should belong to a small group of senior staff that has the responsibility to put a plan together and execute it. Tasks should be assigned to your senior staff members and allow them to choose their task teams.

Although the ownership will belong to a small team of senior staff, solicit suggestions from the entire team. This will allow their ideas to blend into the overall Implementation Plan and again promote a sense of ownership from the entire test team, thus making team buy-in more receptive. However, do not attempt to gain consensus from the entire team. Look for innovative ideas and enhancements, but not the approval of every team member. Unanimous approval can rarely be obtained.

Begin training the entire test team on new processes, test techniques and tools as quickly as possible. This will demonstrate the message of commitment and support for improvements from the entire management team to the test team. It also sends a message that it is "time to get serious". To build credibility, utilize external industry experts to teach the classes so as to reinforce the message that the test management team has been sending.

3.5 Core Team Driven

As the improvement process begins rolling forward, establish a core team to oversee and guide the progress. The team should consist of test managers, senior test staff, and key individuals that represent the external interfaces with the test group (i.e., representatives from development, technical publications, requirements authors, customer service, etc.). Members of this core team

should be periodically rotated to allow for fresh ideas and new views. The team should meet regularly (at least once a week).

The responsibilities of this team are to create a charter that reinforces the vision and goals of the Improvement Plan, and to track and measure progress along the way. The team should establish a set of metrics to gauge the progress, maintain accountability, formulate work groups and articulate progress up and down the communication chains.

3.6 Formation of Work Groups

A Work Group is a team of individuals assigned the responsibility of specific improvement tasks led by a key member of the test group. This key member's responsibilities include defining other individuals for the team, assigning tasks, establishing milestones, and tracking results. Some examples of work groups would be a team for automation development, a team for test document improvements, or a team for identifying additional improvement opportunities.

The benefits of the Work Group concept are 1) it delegates the process improvement tasks to key members of the test group, 2) promotes buy-in and ownership into the Improvement Plan, 3) provides focus on given tasks, 4) provides goal setting opportunities for test engineering staff, and 5) establishes status reporting to the Core Team as required.

4 OUR IMPLEMENTATION APPROACH

4.1 Initial fishbone session

We began by conducting an initial fishbone session with our seven System Test Managers located in multiple sites. NetMeeting and Visio were used so that all could actively participate. Three major categories resulted based on our input: Process Issues, Interface Issues, and Test Issues. In some cases, input overlapped categories. We stressed the fact that there is no right or wrong method for grouping issues.

Process issues were sub-divided as follows:

- Bug meetings
- Metrics
- Deliverables
- Test Documentation
- Test Design

Interface issues were sub-divided as follows:

- Communication
- Deliverables
- Technical Publications

Test issues were sub-divided as follows:

- 24 hour (sanity) test bed
- Education
- Test Configurations
- Automation

- Multiple Locations

4.2 Scheduled offsite meeting with key players

Once we had completed our inventory session, we scheduled an offsite meeting with three managers and our director to summarize, prioritize, and formulate our implementation plan.

Not only did this meeting have the support of System Test Managers, but it also had the support of upper management. The offsite session was critical to the success of process change. It allowed us to focus on the issues and stressed how important change was to upper management.

Day 1 of the offsite was dedicated to summarizing and prioritizing the issues. We identified over twenty issues and defined five major project categories. Those categories were:

- Upgrade the test process
- Implement Test Management and Automation
- Modify Test Configuration Designs
- Implement Test Engineer Roles
- Communicate New Direction

4.3 Issues grouping

On Day 2 of out offsite session, we began grouping the twenty-plus issues into the five major categories. Below is a summary of the issues grouping.

<u>Test Process Objectives</u>

Our focus in this area was to standardize our documentation. We realized that without standardization, we would not be able to move forward to Test Management. We also realized that by modeling our documentation on IEEE standards, we could take advantage of proven methods and expose our staff to higher levels of quality in test design. This approach was also a way to set consistent standards for test design in all sites. At the time, our test cases were stored in numerous Microsoft Word documents and used several different formats. Detailed objectives grouped into the Test Process category are listed below:

1. Develop New Test Document Templates (modeled after IEEE)
    - Test Plan
    - Test Design Specifications (TDS)
    - Test Case Specifications (TCS)
    - Test Procedures
    - Test Report
    - Test Assessment Report
2. Develop standardized Visio template for designing configurations
3. Conduct training on our process and its usage
4. Establish an education plan to for all Test Engineers. A large part of this plan is SQE seminars. We have found that onsite sessions are very effective.
5. Submit changes to our company's Project Life Cycle (PLC)

6. Implement benchmarking to see how we compare to test organizations in other companies

Test Management and Automation Objectives

A critical component to our process was Test Management and Automation. We needed to convert our test cases to the standardized format and then import them into our test management database. This would then allow us to move forward in automating test reporting, performing risk-based testing, and gather metrics. Detailed objectives grouped into this category are listed below.

1. Establish a test case naming convention
2. Develop interfaces to test equipment
3. Design a procedure for configuring workstations to use TestExpert (Test Management Tool)
4. Set up a system for TestExpert test case version control using PVCS Version Manager
5. Acquire necessary capital to implement Test Management in all sites
6. Install and debug the tool configuration
7. Conduct training on usage of TestExpert
8. Define TestExpert Database Manager position

Test Configuration Design Objectives

At the time of our offsite session, we had numerous large systems in our test environment. In addition, our test cases were tied to a specific test bed and not modular in design. As a result, our cycle times were continuing to increase with each release and upper management was concerned by the capital budget increases. We focused heavily on this category as grouped the objectives below.

1. Reformulate test strategy for feature-oriented test designs
2. Redefine role of and limit number of large systems
3. Redefine role of 24 hour sanity test bed
4. Restructure test beds to smaller test bed design
5. Create Test Configuration Control (TCC)

Test Engineer Roles Objectives

We did not have a defined career path within our System Test organization at the time of our offsite session. In addition, there was no differentiation in responsibilities between our senior staff and our more junior members. One of our goals in this area was to align the Test Engineer roles with the new process. The diagram below illustrates this alignment. Our more senior members are now involved in the phases such as planning, design, and assessment. Our junior members are more involved in phase 4, test execution. This approach also provides for cross training and mentoring of others while offering more responsibilities and ownership to our senior staff members.

=== Insert role diagram here ===

Communicate New Direction Objectives

All agreed that this was perhaps the most important category. Without a strong communication plan, we would not be able to effectively implement change. The key objectives for communication included:

1. Communicate positive message emphasizing the critical role of feature/functional testing
2. Evangelize the new paradigm and identify its value
3. Communicate required developer mentality
4. Continue process improvement
5. Provide test process training

4.4 Formulated a plan

After evaluating our position, we decided to use a combination of prioritization strategies for implementing our plan.

Critical issues addressed first

We knew we had to address our test documentation first in order to move forward with our Test Management objectives. Development of test documentation templates became one of our highest priorities. Process training was also very high on the list so that we could begin migrating our test design to the new format. All test case development for new features were required to use the templates. The conversion of old test cases was also planned in conjunction with other testing priorities.

Quick return on investment

In the area of Test Management and Automation, we chose Test Management as our area of focus. We had limited staffing for both Test Management and Automation. Given this constraint, we first worked on Test Management objectives based on time saved in reporting daily results and in performing risk-based planning.

Implement role-oriented approach with roll out of new process

Our first initiative was to get senior member buy-in to our process. By defining a Core Team to design the templates and Work Groups to begin using the templates, our senior team members could lead the way for others.

Focus on education and communication throughout process

We emphasized the importance of education, especially in the area of test design. Upper management supported us by approving our education plan. One of the first phases of the plan was to conduct onsite SQE seminars including Systematic Software Testing and Mastering Test Design. We also required Managers and senior staff to attend STAR conferences.

4.5 Obtained management approval and buy in

Our next step was to obtain approval and buy in from our upper management. We prepared an ROI presentation using Power Point. The key to this presentation was describing the qualitative as well as quantitative benefits of process change and deployment of our Test Management tool. Even though upper management's tendency was to ask the question "how much money will this save?", we stressed that qualitative benefits will not show return in the early stages of process change.

Examples of the qualitative benefits:

- Standardized approach through the use of templates

- Better requirements tracking throughout the documentation lifecycle (Test Plan, Test Design Specifications, Test Case Specifications)
- Earlier test cases reviews
- Opportunities for reusability of test cases
- More comprehensive test designs and less redundancy
- Earlier involvement in the planning process
- Ability to perform risk-based planning
- Earlier involvement in the development process (designing test cases in parallel with software development)
- Test Management which allows for future interface to test automation
- Ability to provide on-demand test results and allow faster decision making with real time information

Next came the quantitative benefits. We were able to assign a value to these benefits in terms of time saved and reductions in capital expenditures.

Examples of quantitative benefits:

- Reduced cycle times
- Bug reduction by pushing System Integration testing back to Development
- Elimination of time spent on manual reporting of daily metrics and test results
- Reduction in long term capital expenditures by requiring less hardware

We found that by presenting the ROI in a concise and simple format and quantifying the return by quarter, upper management was able to clearly see the break-even point on the initial capital investment. Not only did they agree with the proposal based on its quantitative benefits, they were also impressed with the qualitative benefits that will pay off later in the process. Their only caveat was that we present a status report on a quarterly basis prior to expending additional capital to roll out the test management tool to other sites.

4.6 Communicate our plan down

Our next mission was to communicate our plan down to the System Test organization and those departments with whom we interface. We began by introducing changes during our quarterly team meetings. During these meetings, we introduced the templates, the test case naming convention, the plan for migrating all offices to the test management tool, version control requirements for our test cases, and our approved training plan which included SQE seminars and STAR conferences.

In conjunction with these meetings, we quickly organized a work group of senior testers to begin using the templates and the test case naming convention. We applied their feedback to refine the templates and the process and then asked for their help to introduce this new approach to the rest of the team. This, not only, reinforced the role-oriented approach, but we obtained buy-in from a key group of team members early in the process.

We next introduced our new process to the Engineering Process Group (EPG). This team included representatives from all Engineering interfaces. Many of these groups are involved in the review of our documents and this communication prepared them for future review sessions. In addition, it helped the groups involved in the software handoff by getting their buy in to the updated process.

4.7 Established core team

In conjunction with our communication plan, we established a Core Team to help manage and oversee our process change. This team is still active and includes System Test Managers, Senior

Test Engineers, and appointed members from other departments such as Systems Engineering, Development, Configuration Management, and Test Automation.

The Core Team approach reinforced the importance of change and communication. It is also a forum to set goals, measure progress, and keep the momentum going for process change. One of this team's most important objectives is forming various work groups utilizing and developing key members of the test group.

4.8 Formed work groups

As noted above in the Core Team discussion, change would not be possible without work groups. We have found this approach to be very effective for implementing our plan and developing leaders within the test group. Work groups result in team involvement and buy in and also reinforce the fact that process change is a good thing. Another benefit that has been derived from our work groups is a sense of ownership for the process and the realization that change is evolutionary.

Some examples of our current work groups are noted below:

- Test Management Tool Implementation
- Test Procedure Document Development
- Test Design Training and Mentoring
- Test Case Conversion to template format
- Test Automation Development

5 TEST IMPROVEMENT TOOLS

Many tools can be utilized for test improvement. Below is a list of tools and techniques that we used for establishing and maintaining an improvement process (the **boldface** items are commercially available tools and resources):

- Test summit meetings – special meetings to outline goals and improvement opportunities
- Fishbone diagrams – technique for identifying areas requiring change or improvement
- Questionnaires/Surveys – methods of canvassing and obtaining feedback from large numbers of people
- Process and Work Groups – method of focusing on specific areas of improvement
- Web pages (Internal) – communication method that is easily obtainable by the entire test group and external interfaces
- **PowerPoint®, Excel®, and Visio®** - tools for communicating plans, creating issues diagrams, compiling metrics, and calculating the Return on Investment (ROI).

- **Test Process Improvement (TPI)**

  • Test Maturity Matrix tool used to analyze your current process level in several key areas and suggest improvements in a logical manner

  • Read ***Test Process Improvement*** by Tim Koomen and Martin Pol and/or attend one of their seminars

- **IEEE Standard 829-1998 for Software Test Documentation**

  • Document templates

- **STAR Conferences**
- **SQE Seminars**

  • *Systematic Software Testing*

  • *Mastering Test Design*

  • *Test Management*

- **StickyMinds.com**

6 SUMMARY

It is key to remember that change will always be required. An effective test organization must always be prepared to handle change. As a reminder, here is list of key elements to keep in focus for implementing a proactive and effective change strategy.

- **Planning**
  - Be realistic – Don't over commit
- **Define a vision**
- **Demonstrate ROI**
  - Clearly defined metrics
  - Identify risks
  - Show progress and wins
  - Quantify everything you can (time and dollars)
- **Consistency and Focus**
- **Communication**
  - To upper management
  - Throughout the test organization
- **Training (Process, techniques, tools, etc.)**
- **Self-evaluation and follow-up**

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