

Software Process Improvement at SAS Institute

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INTRODUCTION

Increasing software quality awareness of all SAS Institute employees is a continual goal of the Quality Assurance department. By continually assessing current software processes we can optimize our software life cycle and thus increase reliability and reduce time to market. Software quality groups have been meeting to support process improvement efforts. This paper explains how these groups started, what tools were used, and what progress has been made to date.

HOW DID WE START?

We were looking at ways to get maintenance releases to market quicker. At a management meeting last year, several interested parties brought suggestions for improving the software process. Dr. Goodnight asked that the quality process discussion be moved to the software quality assurance meeting that was being held the next day. Since the president of the company asked for the process improvement work to begin, the attendance at this first process improvement meeting was very high. The software quality meetings usually had about 15 attendees. This day, when the focus was process improvement, we had 60.

Several people had prepared talks including:

- what needs to be changed in our current process
- what changes have been made to my own development process that really helped
- Quality Assurance suggestions for process changes.

These discussions were held for two meetings and generated much interest. We came up with a list of many things we could do to improve our software development process.

WE NEED SOME ORGANIZATION!

What can a large software development company do with a list of ideas of ways to improve the software process? We thought we had brainstormed long enough and we needed to take some action but we needed a focus to unite us on the issues. Luckily, we had a member of the SQA group that had manufacturing experience. She suggested that we use Ishikawa diagrams which are often used to improve a process by looking for cause and effect relationships. She took our list of ideas and made a Process Improvement Ishikawa diagram using the SAS/QC® Ishikawa procedure. We grouped similar activities together and found that we had eight major categories. We thought they fell naturally into committees. Each committee was given a beginning Ishikawa diagram to start their meetings. It was used as an organizational tool and was very helpful in making some sense out of the brainstorming sessions. Each committee started meeting separately and selected a chairperson, decided on their goals or mission, and began devising a plan of action. The committees were:

- Steering
- Information Flow
- Documentation Process
- Product Design and Implementation
- Testing Protocol
- Tools
- Customer Feedback
- Education

STEERING COMMITTEE

This group was first called the management committee. They wanted to educate management on the need for process improvement and help get resources and support. They visited staff meetings from different divisions to get support. It became obvious that support of the various committees was a main focus for this group. They changed their name to the steering committee and took on the functions of

- Support for the other committees
- Recruitment of new members
- Publicity of the process improvement effort
- Conduit for recommendations
- Measurement of the total effort.

They have continued to monitor each of the process improvement committees. Each member of the steering committee is a member of one of the other groups. They report on progress and solicit help when a committee is struggling. To date the steering committee has recommended changes to the structure and function of just a few of the groups. Some groups have never needed input from the steering committee. The steering committee has been a cornerstone of the process improvement effort. They have been the point of contact for all groups and provided the needed momentum when enthusiasm waned.

INFORMATION PROCESSING, SHARING, AND MANAGEMENT COMMITTEE

There were actually two committees, Information Flow and Documentation Process, that joined forces as information flow was the basis of both groups. Poor information flow has been blamed as a root of many problems. The information process, sharing, and management committee formed with a charter of facilitating information flow throughout the Institute by identifying problem areas, analyzing information processing needs, and recommending solutions to the appropriate individual or group. Many diverse divisions of Institute were represented. To date they have worked on a documentation management system, an expanded

corporate library and library information guide, and a survey of communication methods (email, phone, news groups, etc.). With their latest project, from concept to market, they are interviewing members of the development team to examine the flow of information about a new product and how this flow differs among various groups. They will make recommendations based on this research.

PRODUCT DESIGN AND IMPLEMENTATION COMMITTEE

When you talk to a group of software developers about process improvement, they often get very nervous. You are talking about changing their development habits and that is very difficult. The product design and implementation committee's charter is to seek out new information and make it available to developers as pilot projects. If the projects are successful, recommendations for process changes are made. Some ideas have successfully made it to the pilot project stage while others have not. Members of this committee also met with representatives from another software company to discuss software development processes. They have designed documentation templates for some documents that are not currently part of the development process. The group has determined that for those areas they have at least raised developers' awareness. Currently, they have taken on software metrics as their area of interest. There are many metrics already being gathered as part of the development process and this group is focusing all the individual efforts into a corporate effort. With the talent existing to write all the SAS[®] System products, there is plenty of expertise available to collect metrics and generate meaningful reports.

TESTING PROTOCOL COMMITTEE

We have a testing committee that oversees the day-to-day testing activities. They also are involved in improving the testing process. This made it difficult for the testing protocol process improvement committee to determine their scope. They struggled for a while and finally decided that they could not try to improve the testing process until they understood it. So, they started a research project that involved having each group engaged in testing activities at the Institute describe their process. The presenters discovered that in putting these talks together they refined and documented their process. Then, through listening to other groups they found other tools and ideas that would enhance their processes. The committee is reviewing all the presentations and making recommendations for change. One major change that occurred is that a differencing tool that has been used by one testing organization for years is being adopted by other groups. It will ease their testing load considerably.

TOOLS COMMITTEE

The tools committee was relatively inactive during the beginnings of our process improvement movement but are quite active now. Of course, tools are vital to software development, so this committee is a vital link in improving the software process. People tend to write a tool, use it for awhile, and then forget about it. When another person has a similar need they may not know that the tool exists, so they

rewrite it. To avoid this they are cataloging all tools used in-house. By formalizing the tool development process, we can avoid this duplication of effort.

CUSTOMER FEEDBACK COMMITTEE

The customer feedback group has had well run meetings which consist mainly of updating on-going action items and processing ideas for future action items. To date they have collected a list of user contacts from SUGI, published instructions for sitting in on Technical Support phone duty, and established connections to customers via marketing. All of these new resources are available to any employee. One of this group's primary goals is establishing a network such that feedback from customers is readily available to all interested parties on site. They are currently working on collecting customer applications and data sets (to be used in our testing cycle) and writing a survey specifically for user groups.

To gather contact names and promote our quality processes, the Quality Assurance department sponsored a booth at SUGI in 1992. The booth had a large version of the Ishikawa chart for software process improvements, individual charts for each process improvement committee, and forms for users who volunteered to act as customer contacts. This booth is also part of the demo area for SCSUG. Customer contact is essential in assuring that customer needs are met in our software and services.

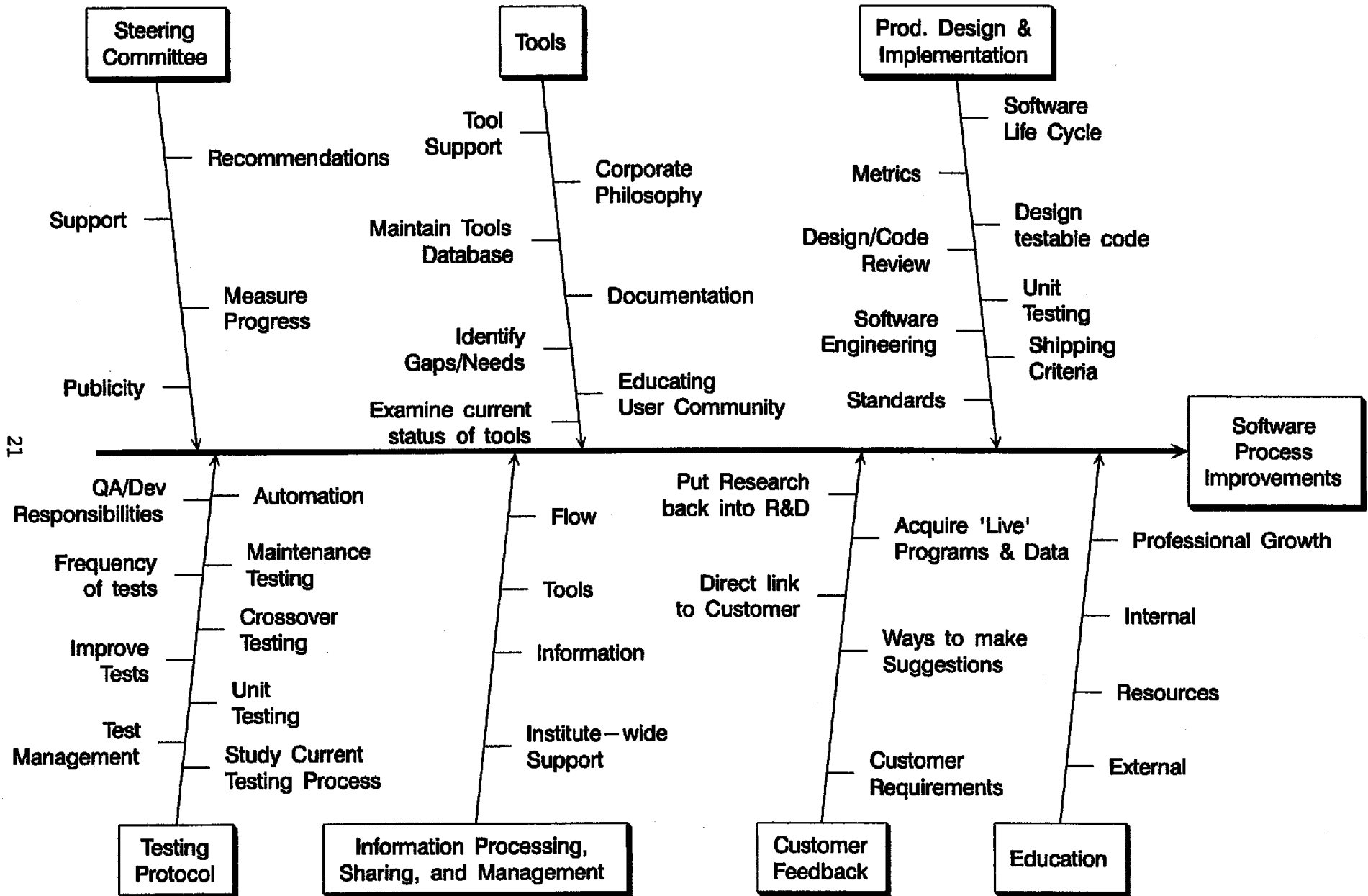
EDUCATION COMMITTEE

The education committee found that they had many areas to organize. Training was occurring in many departments, but it was not immediately available to everyone at the Institute. They decided to organize curriculums for internal education, external education, and professional growth. They also wanted to evaluate the resources required to meet those objectives. Since this group's inception, the Institute has created new corporate education positions. The committee has individuals through whom suggestions are funneled. They have completed outlines of tasks for each area and now will begin designing plans to meet the identified needs.

THE PROCESS IMPROVEMENT ISHIKAWA DIAGRAM

On the following page is the master Ishikawa diagram for our process improvement movement. This diagram reflects status as of September 18, 1992. The individual diagrams are updated as needed and the master diagram is updated monthly. Following the diagram is an explanation of some of the problems we have encountered.

SAS Institute Process Improvement Groups



PITFALLS YOU MAY BE ABLE TO AVOID

We have learned many things in organizing our process improvement committees. We made some mistakes and maybe you will not have to make the same ones.

One committee had a leader who tried to do the job alone. The leader did not call a committee meeting to gather information together and this was actually slowing the process down. The committee head needs to be a leader and to guide the committee in doing work rather than attempt to do it all himself or herself.

A well defined procedure for submitting process change proposals is essential. At one time there was not a clear line of communication between the committees and management. Now there is a group that evaluates all proposals and determines how they can best be achieved.

Groups must not be rushed. They need to evolve into a team and understand the process they are evaluating before they can be effective. It has taken patience and encouragement to nurture the groups. We did try to focus on results so that the groups would realize that they could not just be a think tank but needed to provide concrete plans for change.

At a minimum, management tolerance is needed. Management support is even better. As deadlines approach, it requires much restraint not to pull members off the committees. This short term thinking can get an organization into trouble. Process Improvement is a long term goal and you need to remember that some effort currently will save much effort in the future.

CONCLUSION

Process Improvement is not a quick fix. Although they started a year ago, some of the committees still think they are only just beginning. The process requires a:

- leader
- steering committee
- lot of committed individuals.

Also, the company's upper management must have an attitude that it wants to improve the processes. The committees need enough structure that they know who will handle suggestions. Committee members need support from their managers to proceed. Once in place, there are several benefits to the company. These include a higher quality product, happier customers, and a shorter time to get the product on the market.

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