

## The automated application of a Group Support System (GSS) for a Quality Self-Assessment Process.

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### Abstract

*This paper describes the automated application of a specific Group Support System (GroupSystems) for Quality self-assessment, using measurement standards defined by the European Foundation for Quality Management. For the EFQM internal self-assessment process the people in the department concerned work without the support of trained external assessors. In fact they carry out the assessment process themselves. This self-assessment process leads to action plans for improvement.*

*The paper summarizes the historical development of attempts to improve quality and shows the benefits of a GSS approach. It then describes the automated GSS process, which includes the transfer of the GSS data to spreadsheet software to calculate the final scores. The advantages of this approach are described, including the self-teach and self-documentation capabilities. The process for a GSS self-assessment meeting, with an example, is described and analyzed.*

*These results of a GSS self-assessment can be used as input to a balanced scorecard.*

*Application of this process shows a high degree of customer satisfaction. The process naturally extends to the use of distributed meetings in situations where it is not practical for all participants to meet face-to-face.*

### 1. Introduction

It is said that the quest for Quality never ends - because more improvement is always possible. If the quest is unending, there are some widely acknowledged measures of progress, including:

- ISO 9000 certification
- the Malcolm Baldrige Award in the United States
- the European Foundation for Quality Management Award (EFQM).

Apart from battling for external recognition, many organizations are adapting these different measures of Quality as internal self-assessment tools. Thus they can

measure and accelerate Quality programs at project and department level, as well as at company level.

The challenge in this self-assessment process is to be both:

1. *rigorous*, so that it will be accepted outside the groups doing the self-assessment.
2. *participative*, so that action plans are fully supported by the groups themselves.

A non-rigorous informal assessment process that had no acceptance by the outside world could indeed improve performance. However an informal process would give no learning opportunity to the rest of the organization, and would maybe not allow the group to repeat its performance improvement in the future, if it had not recorded the rationale behind its decisions.

A non-participative assessment process could obviously have some value, in that external bodies such as senior management, customers, the Government or shareholders, could base rewards and penalties on it. However, if the group was not committed to any resultant action plan, its effectiveness would be limited.

The use of a GSS (in this case GroupSystems) can simultaneously satisfy these two requirements - to be both rigorous and participative.

An added benefit of the process described in this paper is that GroupSystems and similar software has applicability in most other business processes.

### 2. A Group Support System

A GSS is generally considered to be a computer system that supports a group of people working together by enabling them to enter and share data. In these 'electronic' meetings, normal discussion is supplemented by enabling participants to enter facts, opinions, questions, votes and commitments onto a computer, each participant usually having their own computer.

## 2.1 Face-to-face Electronic Meetings

Group Support Systems support face-to-face meetings in three ways. Firstly, with a meeting room equipped with networked computers for the participants and a large-screen video projection system upon which information can be displayed. The second GSS component is software that enables participants to contribute ideas, analyze options, vote on alternatives, and so forth. The third component is optionally a facilitator, who assists in developing the agenda and can help lead the meeting.

## 2.2 Distributed Electronic Meetings

Recent developments in hosted online services and networking thin client technologies make it practical to run Electronic Meetings across organizational networks and across the Internet. Thus participants can take part in meetings from their office or even their home.

An asynchronous continuous meeting is a reliable and efficient way to structure a global team's remote self-assessment process.

There is no complete substitute for a face-to-face meeting environment. However, if used creatively, there are many practical ways to supplement and even extend the face-to-face meeting experience. Remote use of a GSS between periodic face-to-face meetings keeps projects alive and progressing at a much faster pace. Project reporting assignments, for example, can be completed on-line, thus enabling leaders to review team members' work and be better prepared for follow-up action.

Many on-line and remote surveys involving employees, customers, suppliers and the wider community of stakeholders can be seen as forms of distributed meeting.

## 2.3 GroupSystems

GroupSystems, the software used in this paper, was developed at the University of Arizona in the 1980's and is the leading commercial GSS. More detail about this software is given in the Appendix.

For a general description of Electronic Meetings see Weatherall and Nunamaker [12], and Nunamaker, Dennis, Valacich, Vogel and George [7].

## 3. Measuring and Improving Quality

The development of what might be termed the 'Quality Movement' can be traced certainly from the nineteenth century. Earlier than that no significant records seem to exist, although there must have been

very specific quality standards in place as far back as the Pyramids in Egypt and doubtless earlier.

To be seen in their proper perspective, quality improvement initiatives need to be discussed in relation to the changing themes in management theory and practice. Some quality improvement initiatives have focused primarily on reducing defects. More comprehensive processes such as ISO 9000 encompass a broader scope of operations. Many of today's quality improvement processes have evolved into more proactive efforts to monitor and improve quality and performance throughout entire organizations.

One of the first approaches to quality involved standardization.

### 3.1 Standardization as an approach to Quality

Joseph Whitworth, an English engineer, was an early advocate of standardization, applied particularly to screws and threads. His work in the 1850's, both in terms of engineering research and high profile public advocacy of his beliefs, resulted in Whitworth threads becoming part of the everyday language of engineering. These threads being still in use in the second half of the twentieth century (Rolt [8]).

### 3.2 Scientific Management

The major figure in this field at the beginning of the twentieth century was undoubtedly Frederick Winslow Taylor. Taylor's reputation, and the conclusions that have been drawn from his work, nicely illustrate the need for the approach described in this paper. Taylor developed a system that he called 'scientific management'.

Some of the concepts of scientific management have been applied as 'time and motion' study, whereby industrial engineers, usually armed with stopwatches, analyzed peoples' work patterns, worked out how to improve their methods and then how much work they ought to be doing. Payment methods were often based on these studies. Although it is easy to demonize this approach, particularly since time and motion studies rarely involved consultation with the subjects of the study, there is no doubt that it produced some significant results. In 1892, for example, Frank Gilbreth had shown how to triple the output of bricklayers by analyzing their tools and work processes (Watts [11]). This version of Taylor's work is sometimes rather deprecatingly called 'Taylorism'.

However, there was another side to Taylor. The opening paragraphs of his book illustrate this [9]:

"The principal object of management should be to secure the maximum prosperity for the employer,

coupled with the maximum prosperity for each employee.

The words ‘maximum prosperity’ are used, in their broad sense, to mean not only large dividends for the company or owner, but the development of every branch of the business to its highest state of excellence, so that the prosperity may be permanent.”

Taylor specifically argued against the belief that “the fundamental interests of employees and employers are necessarily antagonistic”. The very foundation of scientific management includes the conviction that “prosperity for the employer cannot exist through a long term of years unless it is accompanied by prosperity for the employee”.

Another quotation from Taylor establishes either how far ahead of his time were his ideas, or maybe that some of our new management ideas are not really new “In tomorrows enterprise the knowledge worker will be freed to release creative energy that will result in an era of enormous innovation and discovery, fulfilling the potential and promise of the mind”. Hands up all those who thought that knowledge workers are something to do with the Internet!

### 3.3 The Human Relations Movement

Taylor’s type of approach to industrial organization was strongly impacted in the 1920’s by work carried out by Elton Mayo [6] and others at the Hawthorne Works of Western Electric. Mayo wanted to investigate what effect fatigue and monotony had on job productivity by varying work factors such as lighting levels, rest breaks and work hours. In the process, he formalized upon a principle of human motivation that would help to revolutionize the theory and practice of management.

In effect Mayo found a general upward trend in production, apparently independent of the control changes that he introduced. Among the conclusions from this work were that:

- recognition, security and sense of belonging are more important in determining workers' morale and productivity than the physical conditions under which they work.
- complaints are not necessarily factual; but are often a symptom of concern about an individual's position.
- informal groups exercise strong social controls over the work habits and attitudes of the individual worker.
- group collaboration must be planned and developed.

Such findings don't fit with the theory of workers being motivated solely by self-interest – and even today,

seventy-five years later, the lessons from this work have not been fully absorbed by some executives.

There was of course much other work along these lines, including for example in the UK work supported by the Tavistock Institute of Human Relations. Brown [3] has described some of the results, based upon his involvement at Glacier Metals in North London.

Hence modern theorists generally place more emphasis on worker input and teamwork than was usual in Taylor's time. However, it took a while for the results of the Hawthorne experiments to influence the Quality world.

### 3.4 Goods Inwards Inspection for Quality control

Up to twenty-five years ago, Quality in most organizations would have been restricted to a few inspectors working in ‘Good Inwards’ Department.

Inspection at Goods Inwards was often on a statistical sampling basis. They could read off from charts what sample size should be taken, given the target Quality level sought and the number of items delivered.

This process in effect accepted what would be regarded today as very low quality levels, i.e. failures measured in parts per hundred rather than parts per million.

However, a new paradigm was developing in the Quality movement, proving that higher Quality was both possible and profitable. Although there were many people and organizations involved, it is commonly accepted that much of the impetus came from Dr. Edwards Deming and the Japanese manufacturing industry.

### 3.5 Deming and the Japanese influence

The story of the acceptance in Japan of Deming’s ideas before their adoption in the U.S. and Europe is widely known (see for example, Walton [10]). The Deming Prize was established in Japan in 1951, some thirty years before a TV broadcast launched him in the U.S.

It is easy of course to overstate the influence of one man on a nation that had a track record of high quality products, including exceptional ceramics over the last five hundred years, and military products, for example the Samurai sword.

However, Deming’s reputation is well established. What is particularly relevant to this paper is his conviction that Quality, and knowledge of the statistics behind it, should be a concern not just of the specialists in the Quality Control function, but also of the whole organization. Using Electronic Meeting technology for

Quality self-assessment is a direct extension of this philosophy.

### 3.6 Motorola and $6\sigma$

Building on the practical and theoretical work that had preceded it, the  $6\sigma$  program from the Motorola Corporation made a significant advance in Quality.

Figure 1 shows the bell shape of a normal curve. The curve shows the distribution about the mean, with a limit on each side of  $\pm 3\sigma$  covering 99.73% of occurrences.

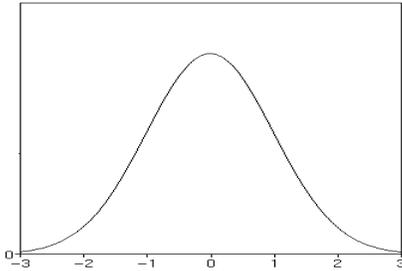


Figure 1. The normal distribution

Statistical theory, in the shape of the Central Limit Theorem, states roughly that the distribution of averages of samples of a large population will approximate to a normal distribution. Provided that we can eliminate the effects of exceptional (or 'special') causes, the normal curve can therefore be used to measure and control processes, whether physical manufacturing processes or office processes (see Weatherall [13] for example).

Fundamental to  $6\sigma$  analysis is that processes will tend to have their own natural variation – and it is not realistic to expect a process to produce output that is better than its natural capability. A function called *process capability* ( $C_p$ ) is the ratio of the *specification width* (the range in value that the customer specification requires) and *process width*, which equals the average value  $\pm 3\sigma$ , as illustrated in Figure 1. However this parameter effectively assumes that the center of the process variation will exactly equal the mid-point of the specification. Motorola concentrated on a more precise parameter  $C_{pk}$ , which takes into account any non-centering of the process and specification widths. It is a  $C_{pk}$  of 2 that results in the often quoted figure of 3.4 parts per million. Bhotte [2] suggests that a  $C_{pk}$  of 5 is a desirable target!

To apply  $6\sigma$  approach to office processes IBM assigned an arbitrary target of 3 as the ratio between elapsed time and process time.

However, the  $6\sigma$  approach does not of itself provide the management processes to ensure that a Quality regime is established. Indeed some people regarded the  $6\sigma$  approach as a swing back of the pendulum and a return to some of the worst aspects of Taylorism.

There was also a danger in teaching people the concepts of process capability, since the implication (strongly stated by Deming for example) was that quality problems were often outside the influence of the operator and could only be tackled by management. Hence a broader and different approach was needed to back up  $6\sigma$ .

## 4. The Baldrige and EFQM models

There are two similar models for Quality self-assessment, the Baldrige model having been developed first.

### 4.1 The Baldrige award

The Baldrige award provides a full framework for an organization to deliver Quality to its customers, incorporating statistical process control as appropriate. It has a framework of seven criteria:

1. Leadership
2. Information and Analysis
3. Strategic Planning
4. Human Resource Development & Management
5. Process Management
6. Business Results
7. Customer Focus and Satisfaction

Based on these criteria the award framework has three elements:

- a) Driver: leadership, i.e. criterion 1.
- b) System: criteria two to five.
- c) Goal: criteria six and seven.

The seven categories of the model have within them twenty-four key focus items and fifty-two specific areas for improvement.

### 4.2 The European Foundation for Quality Management

The EFQM was created in 1988 by fourteen leading European businesses as a membership based, not-for-profit organization. It currently has over 800 members. It has a mission to be a driving force for sustainable excellence.

The EFQM model [1] is a framework based on nine criteria within the concepts of Total Quality Management. It is based on the premise that the behavior of an organization's leaders can create a clarity and unity of purpose within the organization and an environment in which the organization and its people can excel. Organizations perform more effectively when all interrelated activities are clearly understood and systematically managed, and decisions concerning current operations and planned improvements are made

using reliable information, including stakeholder perceptions.

The premise concludes with Results Orientation: excellence is dependent upon balancing and satisfying the needs of all relevant stakeholders, including the

people employed, customers, suppliers and society in general as well as those with financial interests in the organization.

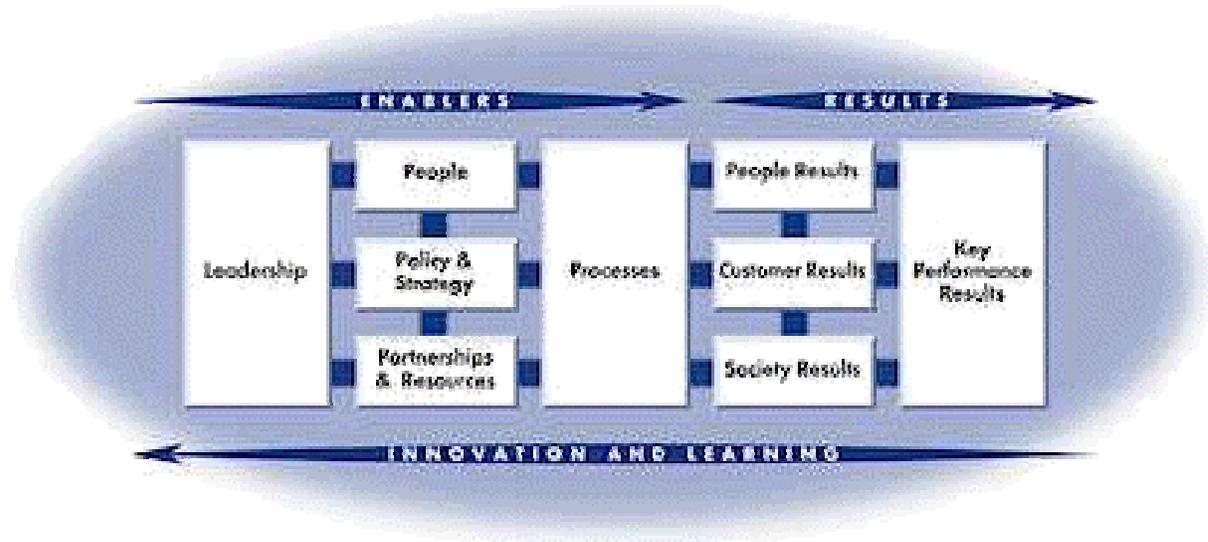


Figure 2. Diagram of the EFQM model

The EFQM model (Figure 2) recognizes that there are many approaches to achieving 'sustainable excellence in all aspects of performance'. It has nine criteria:

1. **Leadership** – how leaders develop and facilitate the achievement of the mission and vision.
2. **Policy and Strategy** – how the organization implements its mission and vision via a clear stakeholder focused strategy.
3. **People** – how the organization manages, develops and releases the knowledge and full potential of its people.
4. **Partnerships and Resources** - how the organization plans and manages its external partnerships.
5. **Processes** - how the organization designs, manages and improves its processes.
6. **Customer results** – what the organization is achieving in relation to its external customers.
7. **People results** – what the organization is achieving in relation to its people.
8. **Society results** – what the organization is achieving in relation to society.
9. **Key performance results** – what the organization is achieving in relation to its planned performance.

These nine criteria are divided into 'enablers' and 'results' as shown in Figure 2.

#### 4.3 Assigning values to the model

Percentages are assigned by the EFQM to each of the nine criteria for use in assessing applications for public awards. For example, Leadership has a percentage of 10%, Processes is assigned 14% and Key Performance Results 16%. The percentages are also expressed as points out of 1,000. The EFQM recognizes that organizations may wish to assign different percentages for self-assessment.

Under each of the criteria are a number of sub-criteria. For example under Criterion 1, Leadership, are the following sub-criteria:

- 1(a) leaders develop the mission, vision and values and are the role models of a culture of excellence.
- 1(b) leaders are personally involved in ensuring that the organization's management system is developed, implemented and continuously improved.
- 1(c) leaders are involved with customers, partners and representatives of society
- 1(d) leaders motivate, support and recognize the organization's people.

Taking 1(c) as an example, it is further sub-divided into:

- meeting, understanding and responding to needs and expectations.

- establishing and participating in partnerships.
- establishing and participating in joint improvement activity.
- recognizing individuals and teams of stakeholders for their contribution to the business, for loyalty, etc.
- participating in professional bodies, conferences and seminars, particularly promoting and supporting excellence.
- supporting and engaging in activities that aim to improve the environment and the organization's contribution to society.

There are scoring guidelines that assist the assessors and self-assessors in looking at two factors: 'approach' and 'deployment'. The range is from 'anecdotal' which typically earns 0 – 10% to 'role model', 'best in class' level that earns 90 – 100%. These guidelines are expressed differently for the 'enabler' and 'result' criteria.

#### 4.4 Strengths, areas of improvement and actions

The self-assessment process includes voting and assessment under each criterion and sub-criterion of:

- strengths
- areas of improvement.

Actions can then be defined to build on strengths and deal with weaknesses.

### 5. What is Self-assessment?

Self-assessment is a comprehensive, systematic and regular review of an organization's activities and results referenced against the EFQM's Model.

The organization or department concerned carries out its own self-assessment, involving as many as possible of the people who can make a contribution and be motivated to implement action plans.

Some organizations have an internal award system for departments that achieve specified levels of score in their self-assessment. A selection of these departments can be assessed by 'external' assessors, i.e. external to the department, but maybe not to the organization.

This whole self-assessment process is excellent preparation for taking part in the prestigious external award competitions.

#### 5.1 Why conduct a self-assessment?

The EFQM has found that organizations using the model for self-assessments have identified the following as typical benefits:

- a highly structured, fact-based approach for identifying and assessing an organization's strengths and weaknesses.
- integration of different improvement initiatives into normal operations.
- ability to compare with other organizations, of a similar or diverse nature.
- education of their people on a framework for improving the organization and how this improvement relates to their own responsibilities.
- a structured way of periodically measuring progress.

Self-assessment promotes a shared understanding of the requirements for performance excellence and competitiveness improvement; and enables the sharing of information about successful performance strategies and the benefits derived from these strategies.

### 6. Why use a GSS for Self-assessment?

Given the necessary complexity of the model, it seems clear that some sort of computer support is required to hold the definitions, guidelines and percentages.

Further, this paper has argued in Section 3 that Quality (or Excellence) programs can only be successful in terms of business results if all the people involved are able to make their contribution to describing the situation, analyzing it and committing to actions. Specifically a GSS has the following benefits:

- equal participation and opportunity to contribute.
- decreased time required
- increased openness and creativity (use of anonymity)
- clearly defined action plans for follow-up
- clear recording of the electronic discussion and the results of the session.

Using a Group Support System for self-assessment incorporates all the threads discussed above, and provides a more effective way to collect and assimilate the observations and suggested improvements of a wide range of managers and stakeholders. A GSS supported process educates everyone in an organization on the fundamental concepts of excellence and how they relate to their responsibilities. It is much easier to involve people at all levels and in all units in process improvement.

With GSS support it is easier to assess the organization at a macro and micro level in a coherent manner. A GSS supported process systematically identifies and allows the sharing of 'good practice' within the organization and more easily facilitates comparisons with other organizations of a similar nature using the widely accepted criteria.

The capability of GSS's for anonymous input has a major benefit in enabling 'sacred cows' to be called into question. This lifts self-assessment above the common perception, as asserted for example by Hammer and Champy [4] that "Quality improvement seeks steady incremental improvement to process performance". This statement may be true of the Kaizen approach to Quality, but is not true of a Quality program built on a GSS-based self-assessment. Quality self-assessment is a business process re-engineering tool.

### 6.1 Prior reporting of GroupSystems in Quality Self-assessment.

Weatherall and Nunamaker [12] refer to a number of examples of using a GSS for Quality self-assessment. IBM used the technique in their International Education Centre in Brussels in 1992-3 and Professor Milton Chen has done similar work at San Diego University. Apart from this there appears to be little specific reference in the literature.

GSS's have been of course used extensively for feedback in many areas with the objective of improving Quality. For example, Lynch and Wood [5] have used a GSS to enable students to give feedback and evaluation of courses in response to a program at the University of South Australia called 'Quality in Learning and Teaching'.

However, this present paper is specifically focused on Quality self-assessment using the EFQM or Baldrige process.

## 7. The GSS-supported Workshop for Quality Self-assessment

There are five components to the workshop process:

1. **Training** – approximately three hours of pre-work, understanding of the EFQM model.
2. **Data gathering** – several weeks may be needed to gather data and evidence.
3. **Scoring workshop** – working through the 32 sub-criteria in an agreed sequence.
4. **Agreeing improvement actions** – with individual team members taking ownership of specific items.
5. **Reviewing progress against action plans** – integrating with the normal business review process.

One very important reason for the success of the Quality movement is the determination that Quality must start at the top.

### 7.1 Training - from the Top

The self-assessment process should not start until there is a commitment from the very top of the organization. Nothing less will do. This commitment needs to be accompanied by a formal – though not necessarily lengthy – training program. Participants need to be able to describe the components of the EFQM model.

It is important that participants be trained in the requisite statistics. An unavoidable conclusion from both Deming's work and the Motorola 6 $\sigma$  program described above, plus of course much other work, is that people who do not have the statistical knowledge to analyze their processes are going to be very limited in their attempts to improve them. Although there are unfortunate exceptions, many organizations entering the twenty-first century will already have tackled the straightforward quality issues and will therefore need to work with ever-greater skill to find further improvements.

The workshop facilitator and process leader (who can be the same person) need training in the EFQM or Baldrige model.

### 7.2 Data gathering

A self-assessment assessment will necessarily involve judgment on some aspects of a group performance, but where facts are available, they should be gathered.

### 7.3 Scoring workshop - the 32 sub-criteria

The sub-criteria are described to the team and any data gathered beforehand is entered in the appropriate heading: Strengths, Areas for Improvement and Site Visit Issues. These headings are available for each of the sub-criteria.

The team members double click on a 'bucket' to open the headings for each sub-criterion. Figure 3 illustrates criterion 1 'Leadership' and the four sub-criteria 1-A, 1-B, 1-C and 1-D. The team members are working on sub-criterion (1-A), 'Leaders develop the mission, vision and values and are role models of a culture of Excellence'. Team members make their entries into 'Strengths' and 'Areas of Improvement'. These entries are then discussed by the whole team, modified and updated as appropriate. Specific site issues, if any, are listed under the Site Visit heading for follow-up attention in the Action Plan. Three vote sessions follow to score for: Approach, Deployment, and Assessment & Review. Results of the votes are accumulated in a spreadsheet to calculate the final scores. A facilitator (if present) helps the team select the most critical issues and places a copy of the top issues in the Action Plan for later attention.

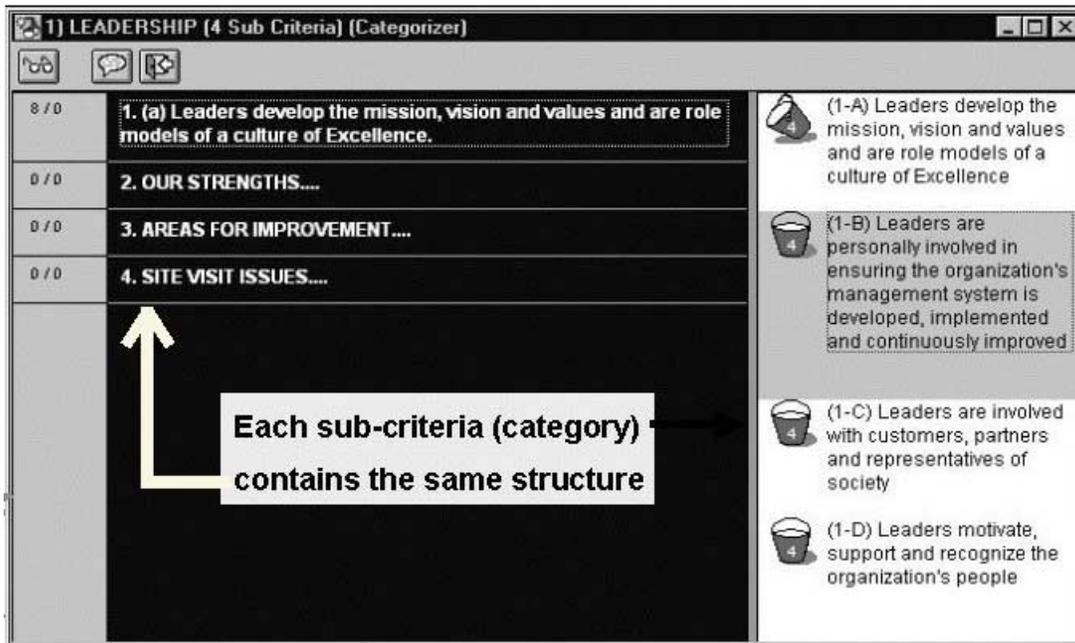


Figure 3. The Four Sub-criteria of leadership

Self-assessment teams require virtually no instructions to begin the identification and evaluation processes. By using a network of computers everyone can 'speak' and be understood simultaneously. Parallel contributions from the team members enable fast identification of key issues, thereby allowing much more time for meaningful discussions with an emphasis on causes and solutions.

The organizing and consolidating of issues and ideas is performed continuously as each category of the self-assessment model that applies to the organization is discussed. A GSS controlled process will ensure that everyone stays focused on key issues throughout the entire self-assessment session.

A self-assessment workshop with ten to twenty participants typically can be completed in two days using GSS software.

#### 7.4 Agreeing strengths and improvement actions

Participants have entered their ideas for strengths in a comment window, as shown in Figure 4. A second

comment window containing guidelines for the sub-criteria may be simultaneously displayed as a guide for team members.

Each assessment team member will see the suggested improvement actions of all the team members because they are entered simultaneously. The facilitator will assist the team in selecting the key issues by sorting them in the Areas for Improvement comment window. The top agreed areas for improvement can be copied to the action plan session for subsequent attention and follow-up planning.

#### 7.5 Reviewing progress against action plans

This stage of the process can revert to normal business monitoring and review processes. However a GSS can have a further role by the use of 'distributed' meetings, as well as the 'face-to-face' workshop described above. Distributed meetings can update actions, ideas and opinions in parallel, thus maintaining a high degree of effective communication between the team members.

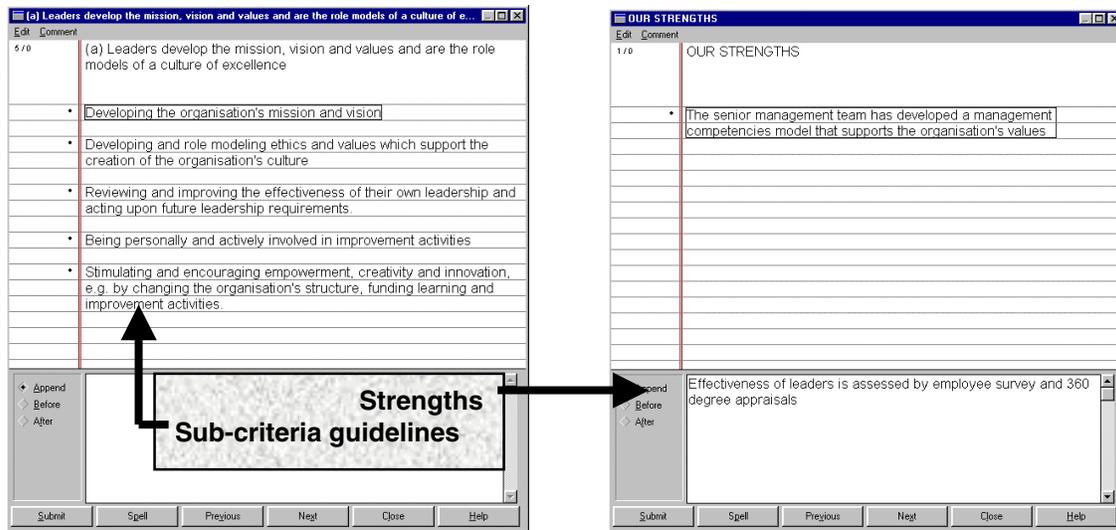


Figure 4. Strengths entered in a comments window.

## 8. User experience and response

The GSM division of Lucent Technologies has performed a self-assessment using the GroupSystems GSS. The self-assessment team consisted of twenty-four key persons from their global regions assembled for a two-day facilitated session. Participants, working in pairs at twelve networked workstations, completed the self-assessment workshop in two intensive consecutive days. The output of the two-day session included the detailed and prioritized list of both Accomplishments and Areas for Improvement together with the results of all the benchmark votes in each of the major categories of the Malcolm Baldrige Award model.

The Lucent Quality Director, who chaired the workshop, compared the GSS supported workshop with previous self-assessment workshops. The consensus among all those who participated in previous sessions was that the GSS supported workshop was far more efficient and produced far greater results than their non GSS supported self-assessment sessions. Previous workshops had required nearly four weeks of follow-up analysis of voting and report preparation.

In the GSS supported workshop the vote results and self-assessment protocol, including the team's Action Plan, were immediately available to all the participants in a formatted and printed form. This extra convenience was considered to be a major benefit.

Of equal significance was the fact that all of the recommendations and proposed actions that were generated during the self-assessment workshop were conveniently available for follow-up review sessions.

## 9. Balanced Score Card

The output of this self-assessment process can provide input to a 'balanced scorecard'. Balanced scorecard is a management system based on measurements of the cycle time, cost of processes, employee satisfaction, customer satisfaction, and financial data. The metrics for the balanced scorecard are defined with reference to the organization's strategic plan, so can be used to assess alignment with this plan.

The balanced scorecard allows the measurement of processes and sub processes, the identification of candidates for improvement, and the implementation of improvements.

The measurement system tracks the metric at recurring intervals to identify trends, and it displays the data to managers to permit them to assess the progress toward success. The use of quantitative data may permit measurements to be compared across business units, as well as across time.

## 10. Lessons learned

The successful application of this technique has taught a number of lessons:

- that the technique works. As is widely established people do find GroupSystems Electronic Meetings to be an effective tool.
- time is saved using this process. A well functioning self-assessment team can typically accomplish three times as much work in a given period of time.

- training is essential. The EFQM (and Baldrige models) are comprehensive and wide-ranging. Team members need to be able to relate the different parts of the model in order to use it effectively. This training must start from the top.
- the automatic process of documentation provided by the GSS ensures quicker implementation of action plans. Without the GSS there could be several person-days work, and corresponding elapsed time, to write up the results of a workshop.
- using a GSS makes Quality self-assessment a more feasible process, by reducing the time required from the workshop facilitator and the team members.

## 11. Summary

This paper has suggested that GroupSystems Electronic Meetings have exceptional capability for performing EFQM and Baldrige self-assessments. The process for achieving this has been presented and described, with benefits and lessons learned.

## Appendix

Section 2 briefly described a Group Support System. The specific tools of the software GroupSystems that was used in the process described in this paper include the following:

**Categorizer:** allow participants to enter their ideas and comments. Comments can be added to ideas, either anonymously or not. Ideas can be categorized (i.e. grouped together) when appropriate.

**Group Outliner:** allows participants to add a structure of sub topics to each topic, up to 15 levels if required. This enables very clear and detailed group discussions.

**Vote:** a choice of single criterion voting methods, including yes/no, true/false, strongly in favor to strongly against and a scale of 1 to 10.

**Electronic Brainstorming:** a tool to encourage creative and 'off the wall' ideas to be entered and developed.

**Alternative Analysis:** a choice of multiple criteria voting methods, including numeric votes, allocation of a fixed amount across multiple options and those described under Vote above.

**Survey:** a tool to allow flexible and speedy opinion surveys to be run.

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