December 1995

Using Groupware for Qualtiy Management and ISO 9000 Compliance

Nereu Kock
University of Waikato

Robert McQueen
University of Waikato

Using Groupware for Quality Management and ISO 9000 Compliance

Nereu F. Kock Jr
Dept. of Management Systems
University of Waikato
Private Bag 3105, Hamilton
New Zealand
nfk@waikato.ac.nz

Robert J. McQueen
Dept. of Management Systems
University of Waikato
Private Bag 3105, Hamilton
New Zealand
bmcqueen@waikato.ac.nz

Quality management programs and ISO 9000 certification efforts accomplished by organisations are typically based on group work and generate large amounts of written documentation. Groupware technology can improve group work and process documentation, but few organisations seem to be benefiting from its use in quality management. This paper tries to fill this gap by suggesting possible applications of some groupware instances - namely electronic-mail, computer conferencing, worflow control and group decision support systems - to each of the several steps of a typical quality management approach called PQMP. An illustration is provided for a company manufacturing trucks parts.

1. Introduction

After the second world war, Japan underwent an economic revolution that had its major impact around 1980, when Japanese products poured into United States due their superior quality and lower prices (Juran, 1989; Walton, 1989). It has led to an intensification of the studies over quality and aspects related to its improvement. It has been perceived that quality improvement is achieved through changes in the organizational structure, mainly in managerial practices. Based on this assumption , a new management methodology called Quality Management was developed. Juran, Deming and Ishikawa are among the authors of pioneering works on it.

Quality Management is the planing and coordination of activities to guarantee and improve customer satisfaction. It is normally accomplished by the interaction with customers, from which changes in the planning, production and distribution of "products" (i.e. goods, services, information or software) are devised in a continuous and gradual process. The modern vision of quality management has expanded the concept of "customer", viewing her/him not only as the final purchaser of the products generated by an organization, but as anyone who receives products, inside and outside an organization. From this perspective all the employees of an organization are customers, and all of them have their vision of what is a product with good quality and what is not, in their respective areas.

In an increasing number of cases the introduction of Quality Management also aims at setting up quality systems that comply with the guidelines set up by the ISO 9000 standards. There are a considerable number of organisations currently running formal quality improvement programs in this way, which is suggested by the number of organisations accredited by independent ISO 9000 certification boards. In August 1994, for example, Exame (1994) published the following list with the number of companies certified by ISO 9000 per country: England (30,500); Germany (2,600); United States of America (1,600); Canada (1,500); Italy (1,500); Singapore (500); Japan (400); Malaysia (400); Brazil (355); Hong Kong (200); Mexico (150); South Korea (120); Argentina (15). By the same time, Minchin (1994) pointed out that 400 organisations had gained certification in New Zealand.

2. The Role of Groupware in Quality Management

Kock and Tomelin (1993) suggest, as part of the PMQP methodology, the following stages as typical stages of a quality management program aimed at ISO 9000 accreditation: perform quality audit, generate quality flow diagrams (QFDs), define responsibilities, generate quality manuals, train all employees, train facilitators, define an internal support area, state organisation's mission, control quality groups, and spread quality groups . Most of these stages can benefit from the use of groupware systems. However, the most useful groupware applications seem to be of: 1)conferencing systems, to better structure and reduce the amount of paper generated as quality documentation; 2)e-mail and conferencing systems, to support pre and post-training discussion; 3)e-mail, conferencing and workflow systems, to support quality groups' activities.

The identification of the most useful groupware applications above supports the assumption that asynchronous groupware systems, rather than synchronous groupware systems, are more likely to improve the efficiency and effectiveness of quality management. The support to this assumption contrasts with the large amount of empirical research on groupware done so far. This research has been mostly focusing on the use of group decision support systems to support group activities, with potential application for quality management programs (Sheffield and Gallupe, 1992; Nunamaker, 1991; Beise, 1992; Pietro, 1992; Dallavalle, 1992).

3. Illustration: A Truck Parts Manufacturer

As an illustration of the use of groupware to support quality management, let us consider a fictitious Truck Parts Manufacturer called KTP (this illustration is based on an ongoing project being currently carried out in Brazil with a a company with characteristics similar to KTP). KTP supplies parts for several truck manufacturers through two plants with approximately 150 employees each, located 300 kilometres apart. Each of the plants has a computer network primarily used to run integrated financial and inventory control systems as well as general utilities (e.g. wordprocessor and spreadsheet).

As most of KTP's biggest customers require it to be certified by ISO 9002, which in turn requires a documented system of procedures for production and quality inspection of goods designed elsewhere, it decided to introduce PMQP. A plan for the introduction was outlined and the company started with three main steps: I)A training program on the PMQP's basic concepts to all employees and on some basic statistical tools to the facilitators, who were selected from among the more skilled employees identified in the basic course. II)The introduction (i.e. installation and training) of two commercial groupware systems to the plants: ProMail, which embodies electronic-mail, computer conferencing and workflow control features, and GroupDecision, a group decision support system. III)A preliminary audit performed by an official certification institute, based on the ISO 9002 norm.

Quality and groupware training sessions were combined, showing through practical examples how groupware could be used in the several tasks comprised in the PMQP's implementation. The two networks in each plant were integrated with ProMail so that users of the two plants could take part in computer conferences, control workflows involving people from different plants and exchange messages with them.

A Quality Committee was created by KTP's board of directors, constituted by the two plant managers, two representatives of the employees and two other members from the Internal Support Area, which was not formally created yet. It was decided that the Quality Committee

would initially meet once a month to make strategic decisions concerning the PMQP implementation, such as assignment of people to certain roles, approval of detailed implementation plans and allocation of resources when special needs were identified. It was agreed that meetings would be performed with the use of GroupDecision, starting with the definition of the Internal Support Area (i.e. its main responsibilities and personnel).

The results of the preliminary audit, pointing out the main problems to be solved so as KTP could be certified, were distributed in the form of a report to all the employees via electronic-mail. The members of the internal support area, already selected, suggested some of these problems to be taken up by some groups of employees, forming the first quality groups. Topics describing the problems tackled by each group were created in the conferencing system, and group members were asked to carry out most of the discussion electronically. This was accomplished by the group members adding comments to the topic and exchanging messages among themselves through electronic-mail. When planned actions were required by a quality group (e.g. to put into practice agreed solutions) the group leader would schedule some activities and control their execution using ProMail's workflow control functions. All data generated would be attached to the topic, hence requiring minimum effort from the internal support staff to keep track of quality groups' development.

The documentation of the quality system was carried out at the same time as some changes in the manufacturing and inspection were accomplished so as these processes could comply with the general criteria set up in ISO 9002. The Quality Committee defined, through a meeting session with GroupDecision, the mission of the organisation and general quality standards to be followed by everyone. They were summarized in what was called the "quality letter" of the organisation and distributed via electronic-mail to everyone and later discussed among managers and front-line workers in face-to-face meetings. The QFDs were generated along with the definition of responsibilities through face-to-face interviews conducted by a group formed by external consultants and the internal support area. The results were held in ProMail as files attached to conference topics for revision, which was carried out by interviewees suggesting modifications through comments and electronic-mail messages. With this information available the same group wrote the quality system manual and the procedure specification manuals. Those manuals were attached as files to topics in the computer-conferencing system, for public access.

After approximately one year KTP was accredited by ISO 9002 on its two plants, both after the first visit of the auditors. It also had a remarkably small number of printed manuals being handled by employees, which was quite different from other certified organisations. As a result of its quality system implementation it expected to increase its international market share, and reduce costs, mainly as a result of changes proposed by quality groups. When

compared with other similar organisations, KTP significantly reduced the duration of the certification time.

4. Conclusion

KTP's case provides an illustration of groupware utilisation to support several different stages of a quality management program. This quality management program, despite being based on a specific methodology - PMQP, can be seen as a general example of a quality management program aimed at accreditation by ISO 9000. KTP's case highlights the fact that both synchronous and asynchronous groupware can be used in supporting quality management, but that asynchronous groupware holds the most potential. One explanation is that most of quality management activities require data collection and analysis over time, which is better performed in an asynchronous way, and public sharing of information, which is particularly well supported by some conferencing systems.

Groupware use on quality improvement programs is new. Few studies have been reported, with the majority about experiences with group decision support systems to support quality groups. There is a huge potential application for groupware to support quality management procedures, as the number of companies seeking quality management certification is expected to grow exponentially in the next ten years. Groupware itself is a new and rapidly evolving set of technologies, and as these technologies move from the lab to the marketplace as commercial products, there is likely to be increasing use on quality improvement and certification.

References

Beise, C., Bringing The Meeting to The Group: Groupware on a Portable Wireless LAN, *Proceedings of Groupware'92 Conference*, 1992, pp. 503-510.

Dallavalle, T. et al, Groupware-One Experience, *Proceedings of Groupware'92 Conference*, 1992, pp. 470-477.

Exame, *500 Biggest and Best Corporations*, Exame, Brazil, 1994.

Juran, J., *Juran on Leadership for Quality*, The Free Press, 1989.

Kock Jr., N.F. and C. A. Tomelin, *PMQP: Total Quality Management in Practice*, Business Development Centre-SENAC/PR, Brazil, 1993 (in Portuguese).

Minchin, W., *A Quest for Quality: ISO 9000 Standards*, Working Life Communications, 1994.

Nunamaker, J., et al, Electronic Meeting Systems to Support Group Work, *Communications of ACM*, V.34, No.7, 1993, pp. 40-61.

Pietro, C., Groupware Meetings that Work, *Proceedings of Groupware'92 Conference*, 1992, pp. 50-58.

Sheffield, J. and Gallupe, B., Using Electronic Meeting Technology to Support Economic Policy Development in New Zealand: Short Term Results, *Journal of Management Information Systems*, V.10, No.3, 1993, pp. 97-116.

Walton, M., *The Deming Management Method*, Mercury, 1989.