

Quality process and Knowledge Management Issues for the University Information Systems Management:

Sigrun FREDENUCCI and Annick BERNARD

CICG, Grenoble Universities, France

Sigrun.Fredenucci@grenet.fr

Annick.Bernard@grenet.fr

CICG BP 53 - 38041 Grenoble Cedex 9 - FRANCE

<http://www.grenet.fr>

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Abstract: *Our Information Systems Department is involved in an ISO 9002 quality process. We first constructed quality documentation around a quality assurance manual and changed the staff's working methods. We then realized an internal audit and a management review: review of quality indicators and quality dashboard, confidence to the customers. Are discussed the benefits of this quality policy in a university environment, the unsatisfactory points and the how the quality loop led to more knowledge inventory of all the working processes involved in the major issue of MIS availability.*

Preface

The "Centre Interuniversitaire de Calcul de Grenoble", CICG, is Center for Information Resources and Technology shared by the five universities of Grenoble (representing 63,000 students and a number of renowned research labs). CICG provides Management Information Systems (MIS) and backbone networks. MIS software is Unix, Oracle client/server based. Major issues for the MIS department are availability, performance and security of data, as well as software maintenance and improvement.

My team is the support team (Unix, Oracle administration and application maintenance) inside the MIS department.

Why starting a quality approach

The starting point for the quality approach was the necessity to write down the know-how of the MIS department team so as to ensure the continuity of the production output from the MIS department, in the context of frequent changes in team members, and with the purpose of unifying existing documents. The objectives have enlarged to include the capacity to react more rapidly if problems occur, to obtain a faster execution and more security for all tasks that involve a risk to the availability of management software.

We have implemented a system to ensure quality as meant in the reference of the ISO9000 family with the purpose of offering:

- availability of management software in its latest versions,
- performance of servers and databases,
- data safety,
- rebuilding of databases,
- a single entry point and a follow-up for every technical question about the implementation and usage of software,
- a problem resolving process,
- printing services.

Our quality documents

The system to ensure quality is written down in a Quality Manual which follows the reference of the ISO9002 norm (edition 1998), which is a leading example in quality ensuring for production, implementation and related services. It shows the permanent search to provide a better service to the other MIS department services and to university administrations. Since we work closely with all teams of the management software service, of the network department and of the other services of the CICG, we decided to hand out our Quality Ensuring Manual (QEM) during a CICG board meeting.

The QEM is the "written image" of the support service in terms of quality and organisation implemented to support it. Somehow, it describes the activity of the service. It is the document that synthesises all other documents. Therefore, its writing is the major step within our quality approach.

The manual has a threefold use:

- for internal use, it is the reference document for all activities within the reach of the quality process,
- for interactions with other MIS department staffs and, through them, with administrations, it is our marketing image in terms of quality ensuring. It is the document to earn their trust,
- for a future accreditation of our quality system, but that is irrelevant today.

The QEM structure that we chose corresponds to the plan of chapters for the norm ISO9002, which enabled us to address all the requirements of the norm without forgetting any.

The quality process

Let's now briefly expose the implementation phase that corresponds to the three first steps *Plan, Do, Check* of the DEMING's wheel.

The implementation phase

The phase lasted about two and a half years (fall 1998, 1999, 2000), and resulted in:

- the analysis of processes that our work is made of and which are necessary to reach our objectives (manage the operating system, manage Oracle databases, save data, manage software, operate hardware, take care of problems, describe jobs and recruit employees, take care of purchasing, check/manage quality documents),

- the writing down of documents (QEM, processes describing, identifying procedures describing process steps, creation of records of reference, of proving and of tracing, instructions),
- the implementation of the quality process within the service: we write down what we do, we do what we have written down, we prove what we have done,
- the collect and survey of quality indicators (resource utilisation, rates for software unavailability, number of problems addressed, etc.),
- the creation of various dashboards (number of software pieces installed, number of patches and versions installed, number of Oracle connections, running of servers and Oracle databases),
- a internal quality audit (awareness rates, usage of quality documents, etc).

This first phase ended with a formal evaluation of the quality system by the management of the support staff (January 2001) which included:

- an analysis of how the quality system works by the lead quality, based on results of the internal quality audit (the approach was validated and implemented by all, but access to specific documents had to be clarified, support procedures had to be worked on and adapted, procedures to create and modify a quality document had to be reviewed)
- an interpretation of quality dashboards (servers performance, evolution of the number of bases and of the number of Oracle connections (fig. 1), number of treated problems (fig. 2), number of versions and corrections applied to the system, to database manager and to applications, number of printed pages, etc.) in order to evaluate the quality improvements and the correlation between amount of work done and human resources,
- an evaluation of quality indicators (rate of unavailability of software and analysis of the grounds, obstruction of bases, reactivity for the management of problems and of the treatment delays, measures of material performance, respect of delays for system installations, Oracle versions and software pieces, etc.),
- a satisfaction survey at other MIS department staffs which has not succeed for want of answers (a shared computer centre is not a firm, there is no competition, no judgement of the peer work),
- an analysis of the evolution of the team (justification of the employment of a fourth system engineer, excellent impact on the team functioning, work valorisation, management of a long term illness leave and of the substitution of an engineer function without endangering the availability of administrations management information system),
- a QEM distribution to the department's head and to the other teams was made to earn the trust of the other department's teams.

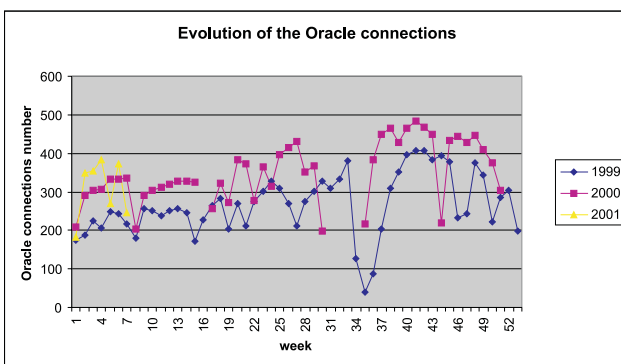


Fig. 1: Number of Oracle connections

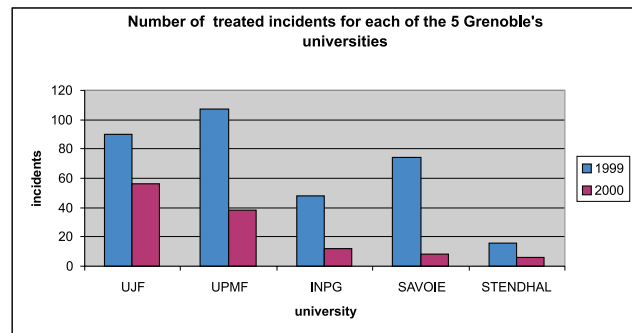


Fig. 2: Diagram of number of incidents/problems treated

The phase of quality improvement

The next phase (Act of the DEMING's wheel) takes place in a quality improvement cycle following the reference ISO9004-4, therefore we defined an action program:

- documents stabilisation so as to look backward, reading and improvement of the documents,
- make easier the search of a document (thesaurus, a search engine),
- analysis of quality indicators so as to improve their performance,
- improvement of indicators' control,
- better take care of problems, and their prevention by corrective actions,
- integration of conception in the process (writing and validation of operating procedures).

Let us express some statements:

1. The support team, maintaining data centre facilities, including all operating systems, Oracle/Unix system administration, software installations, automated network backups and security for all administrative applications, has sincerely appreciated the benefits of this quality approach. Effectiveness and efficiency of system and database administration has been increased. It permits us to do repetitive tasks quickly with a maximum of assurance. Migrating about 100 Oracle databases from one Oracle version to the next, is a work as in a production line, quality allowed us to do it in a short time, and without problems. It permits us to increase the time available fore more useful and amazing tasks as distributed database administration or security issues.
2. Presently, some ISO9002 quality processes are developed in the universities of Grenoble, especially in graduate studies and continuous education fields which have links to the business industry. On the contrary, the field of computing or management production is not competitive, clients are administrations or teaching or searching unites which are not free to choose their computing suppliers, therefore a quality process is considerate as useless. The motivation of satisfying the teams with whom we collaborate is not the first priority in the quality policy. Work rationalisation and therefore human resources spares is much more driving. The main factor would be the writing down of the teams know-how in a normalised form allowing an easy transmission between employees so as to reduce the number of problems due to the unknowing of essential elements that intervene in works which comprise risks. Therefore, this aspect of knowledge storage is favourably welcomed and spreads from team to team.

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The management and the steady actualisation of quality documents, which allow the search of information through the quality manual structure, found its first use to manage knowledge so as to ensure durably the operation of administrations management information system.

3. If we consider our computer management department as an ASP (Application Service Provider) for administrations which have in some way "externalised" their management computing, then our quality ensuring process, and indeed total quality process, has its entire part in an university environment. As it clarifies the commitments that the department has with administrations, and it tries to institute a confidence climate between all involved parts. The head must involve itself so that all the teams adopt that quality process so as to improve the service by avoiding a possible interpretation of bad management in the way of work.

Conclusion

The department's head was convinced by the benefit for the support service brought by the quality process, therefore he had incited and nearly imposed the quality process to the project teams in charge of management software (student, financial, personnel, payroll, directory systems). In those project teams, the emphasis has been laid at the beginning on the knowledge management so as to ensure the continuity of treatments and keep knowledge of local developments, the goal was "not to loose the process" in a quality jargon. To engage a department in a quality process is not possible without a strong and persistent leadership of the top management, and the quality lead. It is essential for the success.

The major issue for the next year will be to improve the quality approach in order to minimise risk full situation for the operations and MIS availability, to increase reactivity and traceability to provide confidence between us and the colleagues of the project teams. We have to install and test GroupWare to tend to more collaborate work and to analyse knowledge management software in order to increase our working methods beyond the quality system documentation. We need appropriate techniques to externalize tacit knowledge and for its exploitation.

Appendix

Quality Management and quality assurance - some vocabulary

Entity	That which can be individually described and considered. For example an activity or a process, a product
Process	Set of interrelated resources and activities which transform inputs to outputs.
Procedure	Specified way to perform an activity. In many cases, procedures are documented.
Product	Result of activities or processes. A product may include service, hardware, software, can be tangible or intangible.
Service	Result generated by activities at the interface between the supplier and the customer.
Quality	Totality of characteristics of an entity that bear on its ability to satisfy stated and implied needs.
Requirements for quality	Expression of the needs or their translation into a set of quantitatively or qualitatively stated requirements for the characteristics of an entity to enable its realization and examination.
Conformity	Fulfilment of specified requirements.
Verification	Confirmation by examination and provision of objective evidence that specified requirements have been fulfilled.
Quality policy	Overall intentions and direction of an organization with regard to quality, as formally expressed by top management.
Quality system	Organizational structure, procedures, processes, and resources needed to implement quality management.
Quality improvement	Actions taken throughout the organization to increase the effectiveness and efficiency of activities and processes in order to provide added benefits to both the organization and its customers.
Record	Document which furnishes objective evidence of activities performed or results achieved.
Traceability	Ability to trace the history, application or location of an entity, by means of recorded identifications.
Quality loop	Conceptual model of interacting activities that influence quality at the various stages ranging from the identification of needs to the assessment of whether these needs have been satisfied.
Quality audit	Systematic and independent examination to determine whether quality activities and related results comply with planned arrangements and whether these arrangements are implemented effectively and are suitable to achieve objectives.