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An experiment on digital library based on the method of TQM system

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Abstract: The principles and methods of TQM (total quality management) were applied to digital library management. TQM puts emphasis on process control and continual improvement. The TQM theories and measures explained clearly in this paper were the scientific tools used in the experiment in the Wenzhou University Digital Library. This paper deals with a very broad range of subjects related to a digital library: system model of TQM for digital library, organization structure, and tasks of Wenzhou University Digital Library, task flow chart of electronic reading room, cause and effect of electronic reading room quality management, systematic model of enhancing electronic information acquisition rate, quality comparison of electronic reading room service, etc.

Key words: Total quality management (TQM), Digital library, Process control
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INTRODUCTION

Total quality management (TQM), as a managing concept and method, achieved much in every aspect of life, has been praised highly by various managers and supervisors and has been commonly applied in libraries in the world. But, as a newly mushrooming digital library, there are still different opinions and ideas on its operation model and managing method (Li, 2005). Based upon thorough research on the TQM system, the problem of applying TQM in digital library is discussed in this paper through an experiment at Wenzhou University Digital Library, and some useful advice on the scientific management of digital library offered in this paper.

TQM AND THE DIGITAL LIBRARY

Total quality management (TQM), as a philosophical concept and management method, undergoes continuous development and improvement while being applied in factories, enterprises and libraries, while greatly promoting global quality management. Ewards Deming and J.M. Juan are the two people who gave birth to TQM (Viljoen and Underwood, 1997). Some forty years ago, Deming, the father of quality management revolution, pointed out that the TQM philosophy is based mainly on the following ideas:

(1) Strong focus on the client, knowing user's needs and meeting those needs, even exceeding user expectations.

(2) Commitment to quality and continuous improvement, adopting systematic and scientific approach to operations.

Seeing from the library developing trend in the world, the digital library, as a commonality organization, plays an important role in human society, culture and education activities. As a digital information resource system sustained by modern hi- and new technology, the digital library still has problems

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on the continual development (Chan and Pang, 2005).

As we know, the total quality management in library is comparatively widespread in western countries, and is already being started in China. However, it is not yet fully and widely used in digital library and need more research and discussion. Here we take the Wenzhou University Digital Library as an example to show the benefits to the digital library from use of the TQM method.

DESIGNING OF TQM SYSTEM MODEL CHART IN DIGITAL LIBRARY

According to the main TQM principle of P(plan), D(do), C(check), A(action) (Wu *et al*., 2002), a system model chart of TQM for Wenzhou University Library Digital Library was designed as shown in Fig.1.

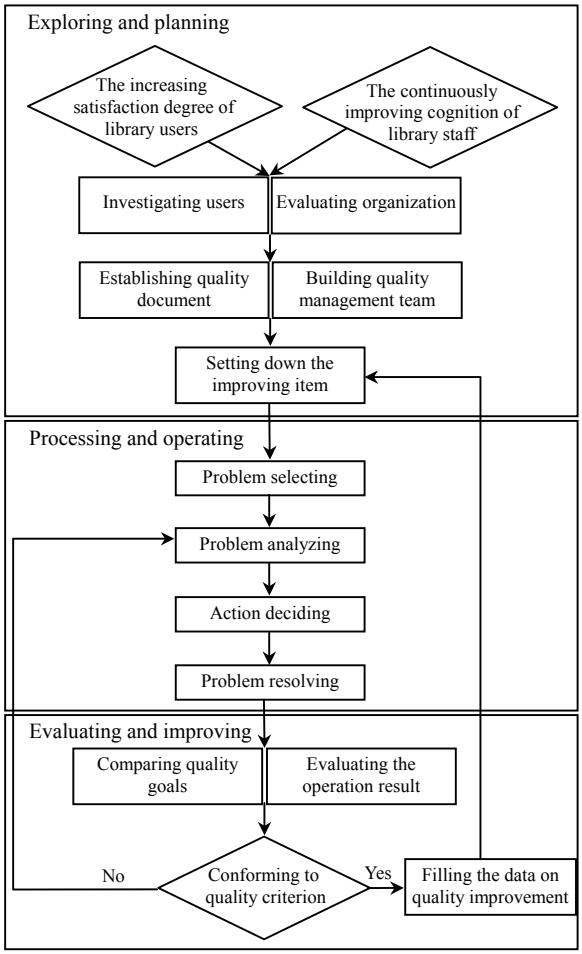

Fig.1 A system model chart of TQM for digital library

The model chart expresses the TQM operation philosophy, which includes the vital cores below:

(1) Connecting course by course;

(2) Circulating unceasingly;

(3) Spiraling upward in development.

The digital library TQM in Wenzhou University is divided into three phases: the first is exploring and planning; the second is processing and operating; the third is evaluating and improving.

The first phase includes: discussion on theory and practice—understanding users—institution evaluating—quality promises—establishing correlative document—confirming improving items—setting up quality managing team.

The second phase includes: selecting problems to be improved—analyzing the problems—setting down the solving plans—solving the problems.

The third phase includes: adopting related digital library quality criterion—locating the deficiency and causes—rebuilding plans to solve the problem—putting the plans in practice again. If the performance matches or exceeds the quality criterion, categorize and save the quality improving process data, then turn to the next round of problem solving.

To sum up, there are three key points we have to learn from the TQM model system:

One, the system is a closed loop which is continuously running and spirally uplifting, its power comes from the two kinds of users—readers and staff. Its outer power is the requirement of users' satisfaction degree which is increasing continuously and led by the advancement of social technology environment and the improvement of information circumstances. Its inner power is the awakening of staff's active consciousness as a master, the potential exploitation of information service innovation and the exploitation in the fields of information navigation.

Two, the principal part of quality management is the quality managing team and the whole staff of the digital library. The important task of quality management system is to enhance the library staff's quality and ability, awaken and lead their innovating consciousness, rely on their ability and wisdom. And the key point is to achieve quality management.

Three, in order to solve the problem directly and clearly and to operated easily, it is necessary to adopt effective scientific method to solve a quality problem. For instance, to draw a flow chart of a cyclical process,

a flow chart of cause and effect of a problem, table of solving plans, etc.

Under the guidance of TQM system model philosophy, an organization structure and task chart of Wenzhou University Digital Library is set up (Fig.2).

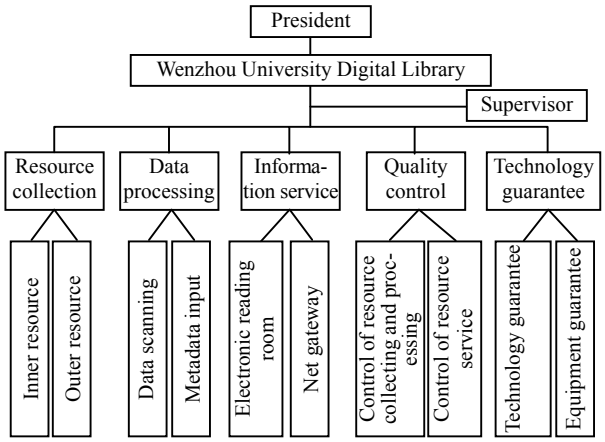

Fig.2 Organization structure and task chart of Wenzhou University Digital Library

The chart is designed with five modules: (1) resource collection; (2) data processing; (3) information service; (4) quality control; (5) technology guarantee (Fig.2). And every module of them has its own department and certain task. For example, the resource collection department has two tasks: outer resource collection and inner resource collection. Operation of all the departments must based on the TQM principle. The main idea during the operation is to always focus on the users and use some scientific method to fulfill their task effectively.

SOLVING QUALITY PROLEMS BY ADOPTING SCIENTIFIC TOOLS

Here we take electronic reading room as an example to show how to solve a certain problem with scientific tools (Meng and Xu, 1999). We should apply certain tools to solve the problems of improving the service quality of electronic reading room, and increasing learning literature resources acquisition rates. Firstly, we should draw a task flow chart of electronic reading room (shown in Fig.3). Secondly, drawing the cause and effect chart of electronic reading room quality management (shown in Fig.4).

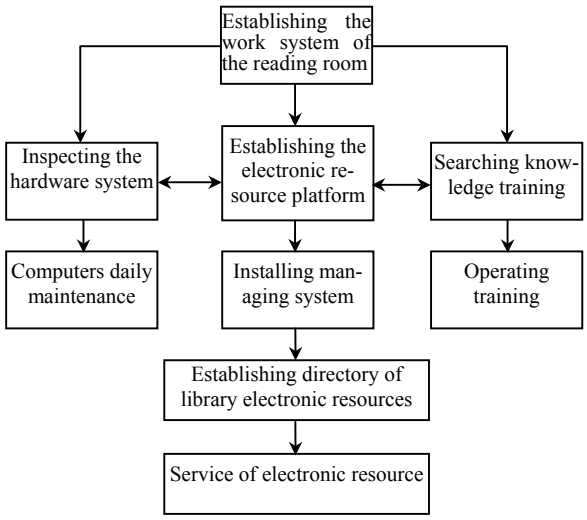

Fig.3 Task flow chart of electronic reading room

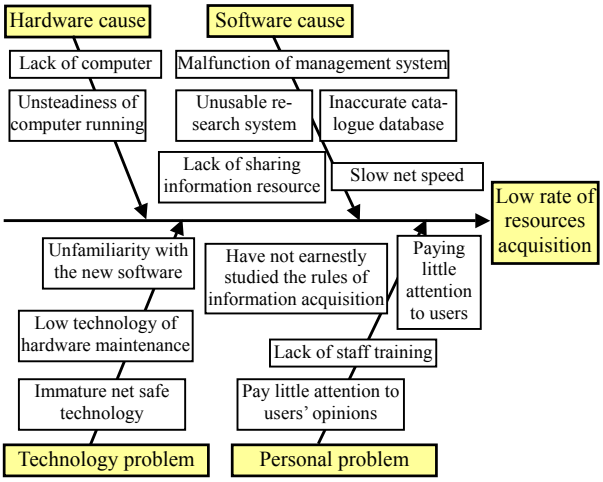

Fig.4 Cause and effect chart of electronic reading room quality management

Fig.4 shows that there are many causes that can affect the acquisition of electronic resources. On the side of hardware: unsteadiness of computer running; on the side of software: lack of sharing information resource; as to the technology problem: low technology of hardware maintenance; and as to the personnel problem: paying little attention to the users opinions, etc. All these causes have different influence on the acquisition of the electronic resources, some of them are the main causes, and others are subordinate ones. To separate the few fatal causes from the mass of causes, we can use the following form to find out directly the rate of every problem part and focus on the main causes (shown in Fig.5).

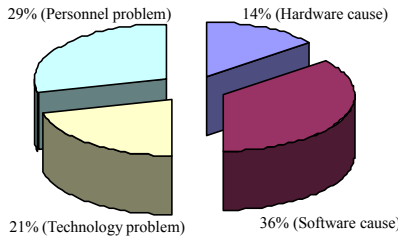

Fig.5 Cause chart of low rate of using electronic reading room literature

It is obvious that the software affects the literature ensuring mostly (36%), it is the main cause of low rate of literature ensuring. The personnel problem is the second (29%), followed by technology problem (21%), and the hardware problem is the least (14%). While solving the problems, we should pinpoint the main conflict and take prior consideration of the main cause. In order to find out the detailed causes of the four problems, we can keep on drawing chart of these four problems, make continuous analysis according to the problems, and find out the main root (Table 1).

Table 1 Quality comparison table of electronic reading room

Settling	Item			
	Hardware	Software	Technology	Personnel
Problems	Unsteadiness of computer running	…	…	…
Causes	Low-quality of the hardware components	…	…	…
Measures	Contact the manufacturers for repair service as soon as the problem arises	…	…	…
Fulfilling person				
Fulfilling time				

In the process of the problem solving, we can amend the measure according to the operating instances, inspect the work methods, and make it operate smoothly. Thus, if the cycle of total quality management plan is completed, we start the next process of problem solving. A systematic chart of improving the rate of electronic information acquisition shows the whole process of the problem solving (shown in Fig.6).

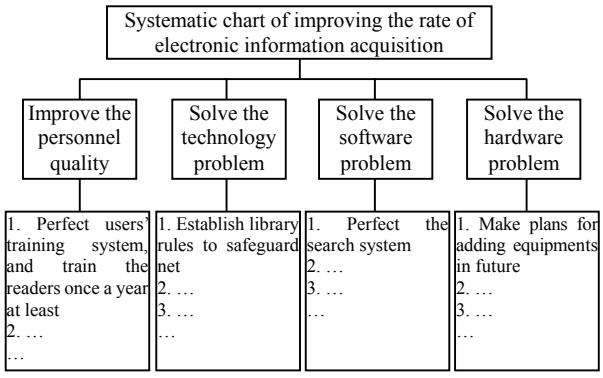

Fig.6 Systematic chart of improving the rate of electronic information acquisition

BENEFITS FROM TQM IN WENZHOU UNIVERSITY DIGITAL LIBRARY

Among many benefits of TQM in Wenzhou Digital Library are:

(1) Switching from the resource model to the performance model, which enhances the interaction between performance and resource according to a defined standard for quality. Thus TQM produces a system for achieving quality performance and enabling a continual review process to operate.

(2) Reducing the conflict between the lack of the resource and the requirement of the readers because of weak recognition of service quality. Scientific quality management continually improves interior management to meet the user's expectation by operating quality management in digital library, and lead the library management and service to a better circular orbit.

(3) Upgrading the library culture. Renewing the digital library organizing culture by adopting and practicing user satisfaction and continuously improving the idea of service. The work group understands completely the slogan of "reader first, user foremost", and the proposing of "internal user" shows the humanized thoughts of both readers and the staff. All of this greatly strengthened the staff's active spirit as a host and their work responsibility, and the work atmosphere becomes more harmonious.

(4) Obtaining staff development. Training is an essential element of a successful TQM process. In Wenzhou University Digital Library, every librarian has at least one chance to attend formal professional

technology training, short- or long-term. What is more, they have a special training method learned from each other among the digital library staff. There are two ways: the first is to hold training on searching for knowledge in a certain database weekly. It is a training phase of the whole university, while the digital library staff are all required to attend. The lecturers are digital library staff, and some specialists from other departments. The second way is to have regular meetings on new knowledge and information communication. The meeting is held inside the digital library every two weeks. For every meeting, one of the staff is appointed to give a lecture to the whole staff on topics of new knowledge, new discoveries, software, technology or method in the field of digital library, leads the whole staff to learn, communicate and discuss. In this way, the group enhances its potential development, ensures the group making more improvement in professional technology and keeps the advanced level in the field.

CONCLUSION

Implementation of TQM in digital library is still a new task in the field of library science and information organizations and has the end result of actively guiding and improving the actual work of the digital library.

First, the setting of quality document strengthened the realization of relevant criterion in every phase of digital library operation.

Second, by evaluation of resource sharing in quality management, we can set up a system for continually judging and improving the use of and benefits from resource and equipments. Thus we can realize and control the advantages of the digital library community and the problems arising from the processing, and lead the operation of digital library's continuous development and improvement along the correct track through the dynamic managing circle.

This paper gives an elementary discussion on the connection of the TQM and digital library management through a case study of a digital library. The paper also emphasizes the essentiality of the TQM theory from the writer's viewpoint and shows the necessity and importance of applying the TQM theory in digital library management. From the experiment of Wenzhou University Digital Library, we can know that scientific methods of quality management surely have stimulating effect on the digital library and drive it to more energetic development.

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