# Enhancement of hospital libraries and information services through an e-support system for lifelong learning quality methodologies and tools

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***Abstract:*** **Quality is indeed a multifaceted concept entailing multiple consequences for the overall management of healthcare services. Quality methods and tools are designed to be simple and effective in identifying, organizing, quantitative and qualitative operational healthcare data. Healthcare professionals are empowered through the use of such tools and methods. Furthermore, quality methods and tools are essential; hence they must "communicate" efficiently to the healthcare professionals. This work is providing a Library and Information Services (LIS) framework for the development of a professional-centered e-support system for learning quality methods and tools. The approach is based on taxonomy for studying the contributions of hospital LIS as well as British Standards and in particular the BS 8423-2003 "a code of practice for e-support in e-learning systems". Moreover, novel methods for teaching quantitative statistical methods as well as qualitative approaches for quality in healthcare are considered. Therefore, the role and the contributions of a modern hospital library are exhibited for providing the information services required for the most excellent learning experience**

***Keywords:*** **Quality, library information services, healthcare, e-learning systems.**

## 1 Introduction

In healthcare, the human activities and needs are the driving forces for both quality and information services' design and provision. Over the past decades, information and communication technology advances has resulted in a reassessment of many management practices. Quality management, in particular, has been part of the "healthcare service" landscape for a long time now, incorporating novel social and economic demands. Quality is indeed a multifaceted concept entailing multiple consequences for the overall management in healthcare services.

User satisfaction and/or service quality (SERVQUAL) constitute essential components of healthcare [1]. Users determine the strategy for quality management in healthcare services [2]. Methodological issues concerning service quality measurements of healthcare have been discussed in the international literature [3] for many years and have been the subject of topical studies throughout the world [4]. In Greece, significant efforts have been made to develop user satisfaction models [5, 6] as well as to assess user satisfaction in healthcare services [7, 8, 9, 10]. The fact is that "user satisfaction" and/or "service quality" are complex phenomena involving intricate operations such as the measurement of quality in healthcare services, currently under examination, their perceived "value", and the social image of the organization.

Total Quality Management (T.Q.M.) methods and tools are designed to be simple and effective in identifying, organizing, quantitative and qualitative operational healthcare data and information. Although quality management, one way or another is important, the appropriate methods and tools for quality have not been extensively employed by healthcare professionals. Furthermore, methodological issues concerning quality measurements, methods and tools in healthcare have been discussed in the literature. The fact is, however, that quality management is in many cases too complex to employ in practice due to many reasons, including lack of the appropriate culture and knowledge relating to the employment of quality methods and tools.

There is no doubt that, at the dawn of the new millennium, information services play a significant role supporting knowledge and research. Nowadays, library and information services in a healthcare environment tend to be hybrid (conventional & digital) providing the necessary technological

background for establishing a consistent level of e-support to healthcare professionals. Indeed, library and information services may set to rescue traditional quality management approaches such as ISO 9000:2000 and/or EFQM model from its widely expected demise. One way to proceed is to study a framework the design of information services for the support of learning quality methods and tools within healthcare services.

In this work, after providing some implications on the definition of quality in healthcare sector, we study library and information services contributions in hospitals and academic healthcare centers and thereafter we propose an e-support system based on the International and British Standards and in particular the BS 8423-2003 "a code of practice for e-support in e-learning systems". Furthermore, we discuss important issues relating to the learning content development, learning methods and material for supporting the quality methods and tools learning experience. Our approach is as much as possible procedural-practical, trying to provide a realistic e-support approach for quality learning within the healthcare environment.

## 2. Definition of Quality in healthcare

Worldwide, systems to measure service quality have been developed which have subsequently been modified according to the particular case and adopted by major organizations. With reference to the nature and structure of the service provided, the public sector is conducting user-satisfaction measurement research in competitive environments in order to develop prior principal and support services with the aim of improving the relationship between the provider and the user. The final objective lies in increasing the market share of the organization. This observation also refers to the close relation between quality management and the marketing policy. With regard to healthcare services, a range of actions within the framework of a "special Marketing" can be introduced, which apart from taking into account the user satisfaction measurement will also aim at meeting user expectations. Quality measurement objectives in the Public Sector differ from the ones in the Private Sector as illustrated by the following statements [11, 12]: A) Questions regarding service pricing rarely arise, whereas data concerning the user's perceived "value" of the service provided are taken into consideration.[13] B) Often questions asked refer to the Public dimension of the Healthcare System, which must function in keeping with the concept of public interest, safeguarding its basic principles such as equal treatment, protection and safety, totality as well as accessibility to health services. C) The "user expectations" parameter assumes major importance for user "acceptance" of the services provided and also for the final "value" [14] attributed to the public system of healthcare services. The trilogy for quality management based on Juran [15], is consisting of Quality Planning, Quality Control and Quality Improvement. Quality planning involves identification of customers and their needs, and development of products to satisfy customer needs, and processes to produce those product attributes. Quality control involves evaluation of the gap between actual and targeted quality performances and the actions to fill the gap. Quality improvement deals with development of infrastructure, identification of improvement goals, establishment of project teams and allocation of resources to implement quality improvement projects.

The approach based on user satisfaction, considers the expectation measurement as well as on disconfirmation of user expectations. In this case, the established model is the SERVQUAL "Service Quality" model developed by Parasuraman et al. [16, 17, 19] Moreover, within this approach Service Quality (SQ) is measured by comparing Perceptions "P" with Expectations "E" and is defined as the difference between perceptions and expectations (SQ=P-E). Regardless of the numerous distinct views voiced within the framework of this specific approach, it is agreed that the user perceives "high" quality when perceived performance exceeds his or her expectations. Another broadly known methodology relating to the expectation disconfirmation approach lies in the model developed by Oliver [16] (expectation disconfirmation model). The expectation concept is gradually incorporated into scientific approaches to Total Quality Management [18, 19, 20].

| CONTRIBUTIONS OF LIBRARY AND INFORMATION SERVICES | ISSUES FOR HEALTHCARE QUALITY |
|---|---|
| **A. PROMOTE CLINICAL LEARNING** | Keep healthcare professionals up to date about clinical practice developments |
| A.1 Inform users about current developments in clinical practice | Support new operations and information technology adoption for better clinical, medical and diagnostic decisions |
| A2. Provide new knowledge and substantiate prior knowledge about clinical practice | Promote evidence based practice (e.g. diagnostic imaging and interventional |

| | |
|---|---|
| | radiology fields) |
| **B. PROVIDE AN ORGANIZATIONAL LEARNING ENVIRONMENT**<br>B.1 Provide information about developments in information technologies and resources<br>B.2 Support professional development of staff | Keep healthcare professionals up to date regarding information resources and services<br>Ensure that new technologies are comprehended<br>Support healthcare professionals research activities<br>Development of learning programs for quality, quality tools and methods |
| **C. PROVIDE RESOURCES AND SERVICES FOR TEACHING AND LEARNING**<br>C.1 Provide easy and convenient access to information resources<br>C.2 Support preparation for licensing, certification and re-certification examinations | Provide access to the appropriate data and information<br>Reliable support of information availability<br>Support ("back-room") activities (e.g. accounts, IT, dispatch, data processing, personnel, legal, and secretarial)<br>Support hospital records management |
| **D. FOSTER RESEARCH**<br>D.1 Support research – related needs<br>D.2 Provide information necessary to prevent duplication of research | Scholarly communication<br>Support research activities of all healthcare professionals<br>Provide new means of research, publication and research results dissemination (e.g. Open Access systems and hospital repositories) |
| **E. FOSTER INSTITUTIONAL ATTRACTIVENESS**<br>E.1 Enhance institutional attractiveness to prospective clinical staff | Attract the right clinical staff through proper information policies |
| **F. PROVIDE EXCELLENT CLINICAL CARE**<br>F.1 Support informed and timely clinical decision–making<br>F.2 Support the development of policies and procedures relating to clinical care | Information regarding all stakeholders' true (expressed and implied) needs<br>Information regarding patient safety<br>Support the quality manual documentation activities |

Table 1: Taxonomy of LIS contributions in hospitals and academic healthcare centers

## 3. Library and Information services for supporting learning in Healthcare

Library and Information Services (LIS) can play an important role in shaping strategies for covering the information requirements of all interested parties and hospital business processes. The Internet and the information society are creating a new era in which information and knowledge are emerging as basic values, requiring novel management paradigms. LIS professionals in healthcare must become dynamic, striving for new ways to contribute in healthcare quality. A taxonomy for LIS contributions in hospitals and academic healthcare science centres has been suggested by Abels et al. [20] and further employed by other researchers (e.g. [21]). Here it is employed in the first column of Table 1 regarding healthcare quality. LIS contributions that may reinforce the contributions of Table 1 are as follows:

- Access to databases: e.g. EBM resources, e-journals, MEDLINE etc.
- Access to healthcare related material: e.g. printed collection, interlibrary loans, etc.
- Reference / consultation services: e.g. reference printed documents, assistance with database searches etc.
- Training & education: e.g. e-classes, curriculum liaison etc.
- Current awareness services: e.g. SDI, clinical alerts etc.
- Support services: e.g. photocopy services, internet access, access to computer lab etc.
- Library as a place: e.g. quite study areas, group meetings etc.

This work interrelate the concepts relating LIS operations to for e-support in a healthcare lifelong learning environment. The goal is to establish a consistent level of support an e-learning systems to healthcare professional learners of quality concepts, quality methods and tools [22].

## 4. Advantages of the e-learning tools

E-learning applications can improve the flexibility and quality of learning by providing access to a range of resources and materials which otherwise could not be available or accessible, such as graphics, sound and animation [23]. In the other hand, e-learning process via e-support platforms has been defined as a powerful tool, to provide information in order to achieve effective learning. All e-learning platforms that have been developed so far give the opportunity to the visitors of the website to study at their own pace, get the information that they need and study when and where they want. This can be achieved by creating a student centred learning environment which can be tailored to meet the learning needs of individual students. This does not mean that these web-platforms focus on the visitor as a separated member. On the contrary, they support communication between professors/experts and learners through web forums included in the e-learning environment. According to this model of websites learners are able to meet in a virtual space

with other members to discuss issues, answer questions and even participate in simulations without having to leave their office or home. An important benefit of e-learning is that a well structured and developed platform can provide frequent and timely individual feedback, for example through evaluation sections and forums which provide positive reinforcement. This leads to an environment that promotes an active approach to learning and encourages collaborative learning. Since the focus on e-learning is the ability of sharing and transfer knowledge into different groups it is clear that the above tools could be used to create a value-added benefit to the learning process. In addition, due to the minimal training, the transfer of important knowledge which occurs though specific style work pattern (considering the various subdivision groups inside the organization) remains an important and difficult task. The result is the economic reuse of high quality expensive resources.

## 5. An e-support system based on BS 8423-2003

Although a number of international standards relating to e-learning have been employed in the analysis, emphasis is placed on the BS 8423-2003 “a code of practice for e-support in e-learning systems”. This British Standard code of practice has been prepared by Technical Committee IST/43, Information technology for learning, education and training. The BS 8423-2003 standard includes an analysis for issues related to the quality and the effectiveness of lifelong learning. Thus, this particular standard provides a good base for analysis. The aim of the proposed e-support system is to provide a means for the hospital management in promoting learning of quality methods and tools among healthcare professionals. The achievement of the aim may also contribute in improving the overall culture for quality management thus, improving the delivery of healthcare services. The e-support system includes specific library and information services and learning materials for quality issues in healthcare, specially designed for the healthcare professionals.

## 6. Methods and Tools for quality management in healthcare

There are several tools to ferret out problems, redesign products and services and improve processes. Brainstorming, fishbone diagram, flowchart, run sheet, Pareto analysis, control chart and histogram are some of the tools that can help to zero in on quality problems. Quality function deployment helps to concentrate on customer needs while developing new services. For example brainstorming is a systematic approach to generate ideas from a group. A brainstorming group consists of individuals who can help to develop ideas relevant to a problem to be solved. Each individual suggests ideas (or directions) without regard to their validity. After all ideas are collected, they are critically reviewed. Brainstorming is a method to identify problems, develop ideas and improve creativity. Also fishbone diagram is a graphical approach to represent "cause and effect". The effect is desired outcome and causes are the spines. The diagram below illustrates a fishbone diagram. In practice most diagrams applications will have more branches where there will be a single outcome that we wish to improve or eliminate. A well drawn fishbone diagram can help to detect effects of quality quickly so that alternative action can be taken. An alternative would be a tree diagram, which is much easier to follow. Flow-Chart is a logical starting point for analyzing current processes. They display logical relationships among various steps. They are useful to identify processes that add costs rather than value. Each of one helps to analyze at every step the process by illustrating it in a clear and comprehensive way. Also it can identify where steps need to be added or removed to improve efficiency and create standardized workflow. Run Sheet is used to identify trends in the data. Follows a process over a specific period of time, to track high and low points in its run, and identify patterns. Pareto Analysis (sometimes called 20/80) rule to describe that 20 percent causes are responsible for 80 percent damages. The Pareto analysis helps a organization to identify areas where most problems are concentrated. Also identify groups of qualitative data, in order to measure which have priority. Finally it can be scheduled over selected periods of time to track changes. Histogram is simply a bar chart in which the height of each bar represents the frequency of each class. Histograms can be effective when comparing statistical, survey, or questionnaire results. Finally a control chart essentially presents the expected range of variations in a stable process. A process is stable when all the data points fall within the prescribed control limits. Control chart is

an excellent technique to monitor a process which is subject to variations. The control chart is a graphical representation of "hypothesis testing'*. All these tools could be used for different purpose, considering the needs of the individual groups (doctors, technicians, administrative department, e.t.c.)

Since the focus on e-learning is the ability of sharing and transfer knowledge into different groups it is clear that the above TQM tools could be used to create a value-added benefit to the healthcare services. In addition, due to the minimal training, the transfer of important knowledge which occurs though specific style work pattern (considering the various subdivision groups inside the organization) remains an important and difficult task. Building healthcare management system through TQM e-support tools brings the demand for a specialist to be permanently available, which is in sufficient command of the system in order to maintain its functionality over time. The applicability of the e-learning system could be effective using specific programming tools (like MSoft Vision).

## 7. Conclusions

Over the last decades, quality has been developed from inspection, quality control, quality assurance toward Total Quality Management. In terms of Healthcare Service Quality the factors related to healthcare user expectations are crucial for the healthcare services acceptance by the potential users. Quality methods and tools could be used as powerful approaches in improving healthcare services. Proper integration and use will ultimately assist in processing information such as identifying collecting policies, enhancing work flow such as mapping acquisition procedures, ensuring client satisfaction by surveying their needs and analyzing them accordingly, and creating an overall high level of quality in all areas of the organization.

This work aimed at bridging the gap of technical issues of quality, to the learners in healthcare, through proper employment of library and information services. The healthcare environment is indeed complex and interdisciplinary, thus, an e-support system for learning is essential. Our approach was based on international standards and the BS 8423-2003 “a code of practice for e-support in e-learning systems”.

A significant number of healthcare delivery systems do not necessarily making use of the best current scientific knowledge. Over the last two decades, information technology has advanced at an unprecedented rate, growing the overall complexity of healthcare services’ production and provision. The healthcare quality management movement, facing such rapid changes, may fail short in its ability to convert new scientific knowledge into theory and thereafter practice. In the literature for quality management, scholars agree that quality is indeed closely related to lifelong learning of quality. Hence, LIS support is important in both assisting quality learning initiatives and empowering healthcare professionals.

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