Implementation of Quality Management System by Utilizing ISO 9001:2008 Model in the Emerging Faculties

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Abstract: This study aims to have first-hand knowledge for implementing quality management system based on the international standard ISO 9001:2008 for academic institutions which considered as the cornerstone toward establishing total quality management system including the basis of academic accreditation requirements. This work uses a case study approach to examine implementation of QMS in HE issue and conducts a review of the closely related models. The study also provides a complete plans and strategies to assist and support their initiatives to achieve quality system. Faculty of Engineering–Rabigh at King Abdulaziz University is considered as the real case study to implement the main features of the quality management system in the educational sectors. The study shows how to identify the stages of applying quality in higher educational institutions, in particular emerging faculty. It concludes that quality management system based on the ISO 9001:2008 can provide a foundation for total quality management and academic accreditation with particular attention to conform all stakeholders' requirements. HE institutions should attempt to increase quality and excellence by applying a total quality management.
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1. Introduction

Quality of Higher Education

The term quality in higher education (HE) has been clarified by several researchers (Harvey and Green 1993; Cheng and Tam 1997; Tam 2001; Mizikaci 2006; Dobrzański and Roszak 2007; Michalska 2009; Cheng 2011). A useful description of quality in HE is that provided by Harvey and Green. They stated that the defining criteria for considering the quality in HE requires an understanding of altered conceptions of quality that inform the preferences of stakeholders. Based on Harvey and Green concepts, the quality has been categorized into five discrete but interrelated categories: quality as excellence, quality as consistency, quality as suitability for purpose, quality as value for money, and quality as transformation. Cheng and Tam (1997) defined the quality as "quality may mean different things to different people".

Dobrzański and Roszak (2007) stated that the idea of quality of education is relatively new and it replaced the concept of effectiveness of education which was used until now. Michalska (2009) has termed quality in education as to fulfill opportunities of customers in educational needs and educational services. Chang (2011) reported that the quality in education refers to the excellence and high standard educational services should be delivered through perfect processes and functions in meeting customers' requirements and satisfaction

Abari et al. (2011) stated that high service quality leads to the students' satisfaction and loyalty, more registrations and maintenance, promotion of benefits and functioning, even in financial affairs. Misran et al. (2011) investigated the outcome based education practice requires that the continual quality improvement (CQI) process is implemented to continuously improve the quality of teaching and learning. In purpose of implementing CQI processes, the feedback gathered from stakeholders (students, industrial advisory panel and external assessors, accreditation panel) covering the aspects of teaching and learning, program structure, and learning facilities, should be considered for enhancing the standard of an engineering program and continuous quality improvement processes.

Draguta (2011) pointed out that the HE system quality is not only the students' major concern, but also their parents', as well as the prospective employers', government and society in general, together with the university teachers and the entire staff, who actually provide a quality educational process. Yarmohammadian et al. (2011) demonstrated that it should be emphasized on improvement of academic quality instead of quantitative aspects. It is clear that for obtaining ideal level, necessary reformation and changes are needed for quality improvement. Thus, scientific board members, experts and staff of university should try to eliminate their weaknesses and empower their strong points.

Quality Management System

The management system is the outline of processes and procedures used to certify that an institution can fulfill all tasks required to achieve its goals. The management system standards exist to provide guidance to organizations on the creation of these processes. There are many management activities in HE, such as, quality management, human resources management, environmental management, information technology management, financial managements etc. The quality management is one of the most prominent HE system activities. Lazibat et al. (2009) defined the quality management system (QMS) as "all activities of the overall management function that determine the quality policy, objectives and responsibilities, and implement them by means such as quality planning, quality control, quality assurance and quality improvement within the quality system".

It is noticed that if the objectives of HE institution are defined clearly and contributed by all employees, the responsibilities of the department and the designation are clearly defined and the procedures are well recognized, it is probable that the services of the institution are "fit for purpose" and meeting the customers' requirements (Abdullah et al. 2011). QMS previously primarily planned for the manufacturing and service industries (Abari et al. 2011; Abdullah et al. 2011). In recent years, QMS have been adopted and applied to HE institutions (Abari et al. 2011; Pratasavitskaya and Stensaker 2010). HE institutions need to demonstrate that they take quality of their programmes seriously to provide the means of assuring and representing that quality (Abdullah et al. 2011). It is reported that that QMS should include all stakeholders in HE institutions, such as, students, employees, teaching staff, government and its funding agencies, accreditors, auditors, and assessors (Harvey and Burrows 1992; Singh et al. 2008)

Quality Management System Models

In order to manage and deliver the best quality educational services to its customers, HE institutions have adopted various models of QMS in their organizations, such as ISO 9001:2008, Total Quality Management (TQM), European Foundation of Quality Management (FEQM), European Standards and Guidelines for Quality Assurance (ESG), and Scottish Quality Management System (SQMS). Consideration should be given to clarify the concepts behind these models and identify the best practices. Comparison of QMS models applicable in HE institutions with regard to: leadership and quality policy, stakeholders approach, learning, processes, resources, measuring of results and improvement was done by Lazibat et al. (2009). ESG, TQM, ISO 9001, and EFQM were chosen in the comparison because of their suitability for use in HE sector. They concluded that those four models have similar requirements for the development of QMS. ESG provide a basic framework for area of HE, but some of the other models should accompaniment them. Malcolm Baldrige National Quality Award (MBNQA) and European Quality Award were compared with the requirements of ISO 9001 standard by Tummala and Tang (1996). They stated that the major purposes of MBNQA and EQA are to promote quality awareness, to increase competitiveness and to understand the requirements of excellence in quality.

Whereas, the major purpose of ISO 9001 standard is to implement an effective quality system to provide confidence in customers that the intended products and services consistently conform to specified requirements. Customer focus and leadership are important for ISO 9001 only up to establishing and maintaining a documented quality system and there is no need to examine critically the company's relationships with customers as the MBNQA and EQA criteria emphasize in customer focus. From the literature studies, the first step in quality system development might be the implementation of ISO 9001:2008 as minimum quality associated requirements (Tummala and Tang 1996; Taylor 1995; Sun 2000; Escanciano et al. 2001).

ISO 9001:2008-based QMS

ISO 9001 is recognized as an international standard on best practices in internal quality management (Lazibat et al., 2009). ISO 9001 gives a series of general requirements that can be applied irrespective of the organization's activity, size or ownership. The direct benefit that can be realized from the implementation of ISO 9001 is the combined alignment of the activities of internal processes that are focused towards the improvement of customer satisfaction which will result in many other reimbursements, whether internal or external. ISO 9001 is based on eight core principles and these in effect underpin the standard and define its purpose and direction. They are:

1. *Customer focus*; Successful HE institutions are reliant upon their customers, thus HE should understand their current and future needs, meet their requirements, and measure their satisfaction degree.

2. *Leadership*; Leaders of HE institutions establish unity of purpose and direction. They should create and maintain the internal environment in which people can become fully involved in achieving the institution's objectives. This goes beyond merely 'doing the work' to how people think and talk and behave: a 'quality culture'

3. *Involvement of people*; Involving people across all levels of the Institution is one of the effective ways to achieve quality. The HE institutions should take full advantage of the staff's knowledge and experience; clarify their job and responsibility

requirements and make them realize that reaching the Institution's objectives is their own objectives

4. *Process approach*; A desired result is achieved more efficiently when the activities and the related resources are managed as a process, rather than as individual tasks. Managing these activities provides greater efficiencies through a clear view of what is happening.

5. *System approach to management*; Management should view all activities and processes as parts of an integrated system. This will then contribute to the institution's effectiveness and efficiency in achieving its objectives.

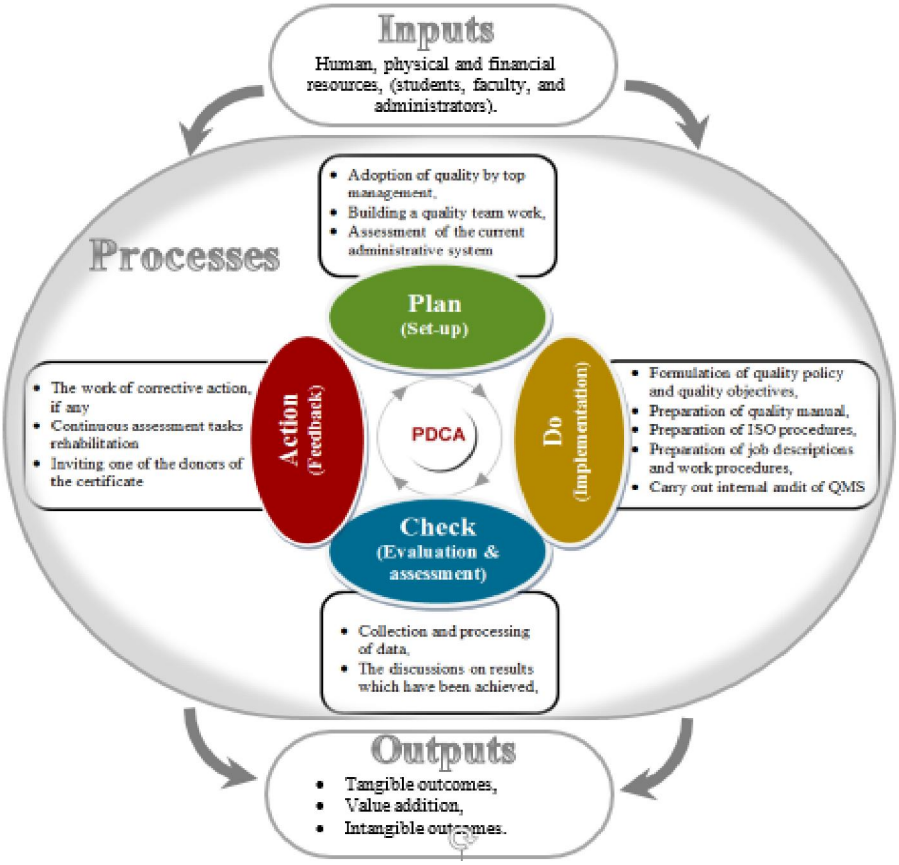

Figure 1. Flowchart of the methodology for implementation of QMS based on ISO 9001:2008 requirements and according to Deming's Cycle.

6. *Continual improvement*; Continual improvement of the HE institution's overall performance should be a permanent feature of the sector that really wishes to excel within labor marketplace. The education institution can improve the quality system by managing the auditing periodically and continuously for the daily tasks.

7. *Factual approach to decision making*; In HE institution, effective decisions should be based on analysis of data and information that has been gathered via predetermined measures.

8. *Mutually beneficial supplier relationships*; HE institution and its customers are interdependent partnership and a mutually beneficial relationship enhances the ability of both to create value

2. Implementing QMS at Faculty of Eng.-Rabigh as an Emerging Faculty

According to the requirements of ISO 9001, all activities within an institution are to be implemented as a system of interconnected processes. FER decided to improve its educational processes and implement a QMS based on ISO 9001:2008 standard. The methodology for implementation of QMS based on ISO 9001:2008 requirements and according to Deming's Cycle (Fig. 1) is consistence of following four steps:

First Step Planning (Set-up): depending on the scope:

a) Adoption of quality by top management

Successful QMS requires the right attitudes and a firm commitment from all involved especially the top management. Often entire *culture* of workplace must go through significant changes to be conducive to a top management philosophy. The maintenance of this philosophy is an ongoing process that must be

reinforced. The top management at FER was fully committed to implement a QMS in its activities, and provided evidence of its commitment through:

1. Communicate with employees to demonstrate the importance of achieving customers' requirements through periodic meetings.
2. Review and assess the efficiency and effectiveness of QMS and the achievement of quality objectives through periodic evaluation meetings.
3. Ensure that necessary resources are provided to support application of QMS effectively.
4. Create a suitable environment to promote the concept of the customer's satisfaction.

b) Building a quality team work (QTW)

Team work is a corner stone issue in any organization and especially in the area of QM and Accreditation. QTW characteristics are important factor for team effectiveness, it include seven aspects such as team heterogeneity, team expertise, team authority, performance for team work, familiarity, team size and training. The Relationship issues that affect the performance of the QTM are; harmony, potency, participatory decision making, workload sharing, commitment, and communication. Special attention was considered when building the quality team with employees from different cultures. Quality cultural awareness (education /training) were preceded or coincided with the quality teamwork building.

c) Assessment of the current administrative system

To assess the current administrative system, QTW performed the following activities:

- ***Review***: documentation and review of the faculty's administrative systems.
- ***Consultations***: discussions with top management, consultant and employees in order to obtain a better understanding of the current administrative system.

In this process, the dean, vice dean, and heads of departments were consulted. Based on this assessment, the quality teamwork documented the current processes and established a timetable for implementation of the QMS as shown in Table 1.

Second Step Do (Implementation): this process is carried out to achieve planned objectives through teaching/learning, combination of internal and external practices quality systems:

a) Formulation, approval, and announcement of quality policy and quality objectives,

The quality policy is the strategy of FER to maintain QMS designed to meet the requirements of ISO9001:2008. The top management fulfills the commitment to quality in such ways that all employees know, understand and carry out the adopted quality policy. The quality objectives are consistent with the quality policy and include the requirements needed for strategic plan realization of the faculty.

b) Preparation of quality manual and general procedures for ISO 9001:2008 requirements.

The working group made ISO 9001:2008 quality manual consisting of brief introduction about the FER, strategic objectives, quality policy and scope of the quality manual followed by ISO 9001:2008 requirements. It declared that there are six mandatory documented procedures and Faculty documented these procedures. The documented procedures are:

1. Management's assessment,
2. Control of documents,
3. Quality control records,
4. Internal audit for QMS,
5. Monitoring of non-conformity,
6. Corrective and preventive actions.

c) Documents needed by FER to ensure effective implementation and control of the process.

In order for FER to demonstrate the effective implementation of its QMS, it was essential to develop documents other than documented procedures, even though the ISO standard does not specifically require them. These documents include:

1. Organizational structure

Organizational chart is a diagram that shows the structure of Faculty and relative ranks of its sectors and jobs. FER Organizational structure involved the following aspects.

- Identifying the activities required to achieve the faculty objectives.
- Grouping up of these activities into workable units.

2. Job description

The responsibilities must be identified so that employee can carry out the tasks entrusted to him. The responsibilities and authorities have been identified for the heads of units after several meetings with top management and those responsible of the established units. Job description has been reviewed first by the responsible of units and finally approved by the top management.

3. Work procedures through illustrations

Work procedures are set of clear instructions with illustrations that employees in FER can follow. According to the ISO 9001:2008, work instructions are optional part and should be developed and maintained for all work that would be adversely affected by lack of such an instruction. In the other hand, an inadequate work instruction can result in customer dissatisfaction. Work instructions were aggregated through four steps:

- Inventory of procedures and operations that carried out by employees in the units.
- Adapt the procedures to achieve their purpose and to improve the service provided.

- Create the instruction which include: steps in order, the responsible of each step, and the form used.
- Create illustrations of the procedures.

4. Customers' requirements and satisfaction

Requirements and satisfaction of all customers (students, employers, teaching staff) should be documented in the system. The customers' requirements were done by preparing questionnaires and distributing them to customers to assess the existing situations regarding to quality practices. The questionnaires were carried out with QMS representative. The questionnaires were distributed to employees, students and teaching staff to indicate the Faculty's quality maturity level.

Table 1: Timetable for implementation and application of QMS

No.	Tasks	Week											
		2	4	6	8	10	12	14	16	18	20	22	24
1	Understanding current administrative system												
2	Developing the organizational structure												
3	formulating the quality policy and adoption												
4	Preparing the job description												
5	Documenting the work instructions and illustrative												
6	Encoding the illustrations and forms												
7	Joining a training course for internal audit												
8	Formulating of quality objectives												
9	Preparing the quality manual												
10	Preparing the general procedures for quality system												
11	Review quality management system documentation												
12	Announcement of quality policy in the workplace												
13	Distributing of a quality management system												
14	Application of a quality management system												
15	Conducting the internal audit for the QMS												
16	Work of corrective action (if any)												
17	Holding management's assessment meeting												
18	Continuous evaluation of the requirement												
19	Inviting one of the donors of the certificate												

d) Carry out internal audit of QMS

The internal audit is a value adding activity, which not only evaluates the effectiveness of the QMS processes, but also determine whether QMS processes conforms to the planned arrangements and the requirements of ISO 9001. A documented procedure was established to define the responsibilities and requirements for planning and conducting the internal audit at scheduled interval. Internal auditors prepared a checklist for internal audit before going into the audit process and used this list to record thematic evidence of the results of the audit whether the results are satisfactory or unsatisfactory. Training on conducting internal audit was provided to employees to provide participants with the necessary skills to carry out the internal audits.

Third Step Check (evaluation and assessment): this phase consists of two parts:

a) Collection data

Data collection aims to obtain relevant, up-to-date and reliable information regarding the implementation of QMS in FER. In this study, the direct observations and the questionnaires were used to collect the data. The internal auditors focus on the cases of non-conformity through internal audit rounds.

The cases of non-conformity include:

1. Any deficiencies in the service provided to the stockholders.
2. Any failure to follow the regulations, rules and work instructions.
2. Any deficiencies in the documentation of QMS and its application.

b) Discussions on results which have been achieved.

Study the actual results (collected in the above step) and compare it with the expected results (goals from the implementation of ISO 9001:2008) to ascertain any differences. Look for non-conformity in implementation and look for the suitability of the plan

to enable the implementation. The discussion on the results was held between quality teamwork, main committees, top management and Consultant.

Fourth Step Action (Feedback): since QMS is a continuous and systematic process it must undergo constant review combining self-assessment with evaluation by an external body, feed-back and organizing procedures for change.

a) Corrective and preventive actions, if any

The aim of preventive and corrective actions lies in identifying cases of non-conformity and corrected as soon as possible and avoids their recurrence in the future. The reported cases of non-conformity are an important part of the quality management system. The identification of non-conformity cases and reporting it is a responsibility of all employees with the quality officials. The internal auditor records the evidence of the completion of the corrective actions effectively.

b) Continuous assessment tasks rehabilitation

QMS is subjected to continuous evaluation by top management's assessment permanently and continuously. Based on top management assessment procedure which has been held after the internal audit the following actions and recommendations were performed:

1. Hold regular lectures for definition of the quality system concepts and the importance of its application
2. Dissemination of quality culture among employees of the college.
3. Constantly develop the job description and work procedures.
4. Constantly update training cards to reflect the training courses for employees

Concluding Remarks

The implementation of ISO 9001:2008 standard is shown on the example of faculty of Engineering-Rabigh as an emerging faculty. Results of the implementation of ISO 9001:2008 are:

- Several processes have been re‑engineered for better performance,
- All objectives and processes are based on stakeholders needs and expectations,
- It is expected that well-organized implementation of quality systems in the faculty would increase the realization of the education by minimizing the process failures.
- The quality management system based on the ISO 9001:2008 can provide a foundation for TQM and academic accreditation. HE institutions should attempt to increase quality and excellence by applying a TQM.

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