

ISO 9000: Application to the Thai Higher Education

ไอสโอ 9000: การประยุกต์ใช้กับอุดมศึกษาไทย

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Abstract

This paper is a study of the ISO 9000 applied to higher education system. The three main questions to pursue are:

1. What is ISO 9000?
2. How can ISO 9000 be achieved; and
3. How can ISO 9000 be applied to the Thai higher education?

ISO 9000 is actually a series of about 15 documents that include both standards and guidelines. It was prepared by Technical Committee ISO/TC 196, Quality management and assurance, Subcommittee SC 2, Quality systems. The three standards in the series are ISO 9001: 1994, ISO 9002: 1994 and ISO 9003: 1994. New guidelines are periodically added to the series. Such as, ISO z1.11 Guideline for the Application of ISO 9000 to Education and Training Institutions was approved and published in August 1996. This paper is aimed to explain and analyse on how to establish ISO 9000 in a brief statements on what kind of criteria for education standard are measures, how many steps to create a quality control, what the qualification criteria for auditors and auditing process are. These processes are seen as heart of quality assurance to build quality management for productivity and effectiveness of teaching-learning process.

บทคัดย่อ

การศึกษานี้มีวัตถุประสงค์เพื่ออธิบายและวิเคราะห์การประยุกต์ใช้ ISO 9000 กับระบบอุดมศึกษาไทย โดยมีประเด็นสำคัญในการศึกษา 3 ประการ คือ

1. ระบบ ISO 9000 คืออะไร
2. ทำอย่างไรจึงจะดำเนินการให้ได้ตามข้อกำหนดของมาตรฐาน ISO 9000
3. ทำอย่างไรจึงจะประยุกต์ใช้ ISO 9000 กับ อุดมศึกษาไทย

ISO 9000 เป็นอนุกรมซึ่งประกอบด้วยมาตรฐานและข้อกำหนดต่างๆ ในรูปของเอกสารราว 15 ฉบับ ซึ่งจัดทำโดยคณะกรรมการวิชาการที่ 176 ขององค์การมาตรฐานระหว่างประเทศ หรือคณะกรรมการว่าด้วยการจัดการและประกันคุณภาพ คณะอนุกรรมการชุดที่ 2 ว่าด้วยระบบคุณภาพ อนุกรมนี้ประกอบด้วย 3 มาตรฐาน ได้แก่ ISO 9001 : 1994, ISO 9002 : 1994 และ ISO 9003 : 1994 ในระยะต่อมาได้ผนวกข้อกำหนดต่างๆ ในการประยุกต์ใช้ ISO 9000 กับสถาบันการศึกษาและอบรมเข้ามาเป็นระยะๆ ด้วยและได้รับการรับรองและจัดพิมพ์เผยแพร่ในชื่อ ISO Z1.11 ในเดือนสิงหาคม 1996 เนื้อหาในบทความนี้ครอบคลุมความเป็นมาของ ISO 9000 การวัดเกณฑ์ที่ใช้ในมาตรฐานการศึกษา และขั้นตอนการทำการควบคุมคุณภาพ เกณฑ์เกี่ยวกับคุณสมบัติของผู้ตรวจสอบและกระบวนการตรวจสอบ กระบวนการดังกล่าวเป็นหัวใจของการประกันคุณภาพอันนำไปสู่การจัดการคุณภาพเพื่อการเพิ่มผลผลิตและความสำเร็จของกระบวนการเรียนการสอน

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Introduction

The term "quality" is the main issue of discussion among managers, directors and chiefs in industry and business, as well as in educational institutions. One of the most popular quality system is ISO 9000. It is an international series of both standards and guide-

lines on quality systems. The 2 basic tenets of ISO 9000 are to satisfy customers and reduce waste.

The aim of this article is to learn about ISO 9000. How ISO 9000 can be achieved and how it can be applied and elaborated to the Thai higher education.

ISO 9000

Standards for quality system were employed during the last four decades in some countries such as the United States and the United Kingdom (Johnson, P., 1993). In 1976, the British Standards Technical Committee 176 established the quality principles for manufacturing companies to show how they set up the internal quality control (Voehl, F., et.al 1994). The standards included the control of product quality, maintenance and predictability. It is a way for consumers to assure that they buy the products with quality and reliability. Later, committee began to work on standards for quality management, quality assurance and quality management system which was influenced by the British BS 5750 (Johnson, P., 1993).

ISO 9000 refers to a series of international standards and guidelines as shown in Figure 1. The system requires the organisation to design, assess of a management system and assure customer satisfaction on products and services.

Figure 1
A Series of International Standards

ISO 9000:	Quality management and quality assurance standards (guidelines for selection and use)
ISO 9001:	Quality system (model for quality assurance in design, development, production, installation, and servicing)
ISO 9002:	Quality system (model for quality assurance in production and installation)
ISO 9003:	Quality system (model for quality assurance in final inspection and test)

Source: Johnson, P., 1993

The ISO Requirement

The standards contain the requirement aimed to manage the organisation efficiently and to provide more benefit to customers. In this case, the scope of ISO 9001 will be given as a sample to show that the requirements will help to manage work effectively. There are three levels of the requirement of ISO 9001:

1. **The Basic Requirement** is that the organisation shall establish, document, implement and maintain a system. It will provide confidence to both producers and customers (Hoyle, J., 1994)

2. **A Series of Generic Requirement** are as following:

- Organisation purpose and missions
- Management system
- Customer requirements
- Management of work process
- Process inputs
- Development of work processes
- Control of work processes
- Process outputs
- Improving work processes
- Assurance of work processes

3. **The most important of ISO 9000** is to maintain a quality system with 20 requirements. Quality system will assist to design and supply conforming product quality and to achieve customer satisfaction.

A Quality System

The ISO 9000 series serves as a vehicle for communication between customers

and vendors. The basic assumption underlying the ISO standards is that a good quality assurance process will satisfy customers needs by reducing nonconformance in products and services. This simple idea has proven to be so compelling that the ISO 9000 series is now used by companies in 110 countries around the world.

Definition

For the purposes of this international standard, the following definitions apply.

☐ **Quality** "The totality of characteristics of an entity that bear upon its ability to satisfy stated and implied needs"

☐ **Quality Control** "The operational techniques and activities that are used to fulfill requirements for quality."

☐ **Quality Assurance** "All the planned and systematic activities implemented within the quality system and demonstrated as needed to provide adequate confidence that the entity will satisfy given requirements for quality"

☐ **Quality Management system** "All activities of 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 quality system."

☐ **An Audit** "A systematic and independent examination to determine whether quality activities and related results comply with planned arrangement and whether these arrangements are implemented effectively and are suitable to achieve objectives."

Internal Quality Audit

The supplier shall establish and maintain documented procedures for planning and implementing internal quality audits to verify whether quality activities and related results comply with planned arrangements and to determine the effectiveness of the quality system.

Internal quality audits shall be scheduled on the basis of the status and importance of the activity to be audited and shall be carried out by personnel independent of those having responsibility in the area audited.

The result of the audits shall be recorded and brought to attention of the personnel having responsibility in the area audited. The management personnel responsible for the area shall take timely corrective action on deficiencies found during the audit.

Follow-up audit activities shall verify and record the implementation and effectiveness of the corrective action taken.

The Significance of Quality Audit

Quality audit will be beneficial to organisation for the compliance with planned arrangement including policy, process, procedure and service. The auditor shall check that product and service meet the specified requirements.

Auditor will gather information, prepare the annual audit program, conduct audit, record observation and report. Auditing must be

conducted against a standard. Auditor will check the process and procedure of work in order to identify the compliance. Auditing report will be reviewed by managements in the executive review to assure quality system effectiveness. There are 3 types of audit. **The first party audit** or internal audit is an auditing by organisation of its own systems and procedures to assure maintenance, development and improvement of the quality system. **The second party audit** or external audit is an auditing by organisation on its suppliers and sub contractors to determine suitability of suppliers and to appraise supplier/subcontractors performance. **The third party audit** is an assesment by a body which is commercially and contractually independent organisation or a certification body to determine whether an organisation's quality system has been documented and implemented in accordance with a specified standard.

Qualification Criteria for Auditors

Auditor is a qualified person to do the auditing. Auditee refers to the organisation where it has been examined. Auditors should not have pressure to do their jobs. They should be independent and act professionally. They are also courteous, tactful, and diplomatic. They must be helpful to the auditee without any argument and acceptance of everything at face value.

Internal auditing should be started at the beginning of quality program. The first party

audit team must consist of members of two unrelated departments. Internal auditing is self-assessments that help organisation to ensure that documentation is adequate to meet the standard requirements and to make sure that the organisation follows its plans and procedures. A good internal audit program will limit the scope of its activities to the absolute minimum to be effective.

The internal auditors should:

- ☐ have good human relationship.
- ☐ assess the quality management system.
- ☐ do random sampling.
- ☐ be trained.
- ☐ be rotated so that everyone can understand the process.
- ☐ ask questions.
- ☐ be responsible to check a system and a compliance.

Quality Cycle in Internal Audit

The internal auditing must be planned ahead depending on size and complexity of each business. Actually, auditing will be done at least once a year. Schedule should be prepared early in order to show the auditing plan for each time. Some companies plan audit schedule throughout the year. The schedule is actually made by management representative and distributed to all staff involved. Auditor and auditee should work

together informally in preparation of document, record and personnel. The progress of their works should be recorded. This can offer an evidence that the requirement are being check and met.

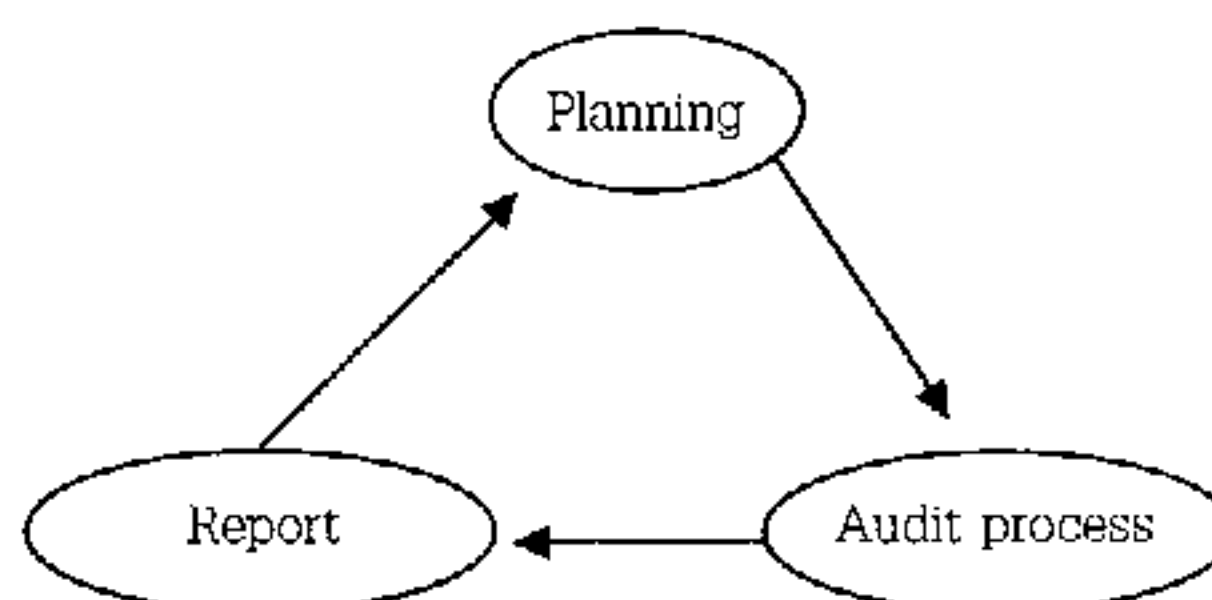
The audit process is that auditor and auditee will have short discussion about what to audit and observe, and ask any questions which have been in mind. The auditor will find out on what have happen in practice and identify the compliance to the standard requirements. The auditor is able to do random sampling to see if the compliance is achieved.

In some cases, the auditor can find the evidence of a deficiency, such as, lack of required record. Discussion of auditor and auditee will help organisation for nonconformance correction.

A quality system is not perfect. It cannot indicate that the whole system does not work.

Auditors will report their system audit after completion of their works. Date of audit, responsible persons, scope of audit, deficiencies found, fruitful comments should be included in the report. Finally, the report must be signed by auditor and auditee. If there are any problems occurred, the follow-up audit should be planed. The cycle of internal audit is shown in figure 2.

Figure 2
Cycle of Internal Audit



Application to the Thai Higher Education

We are all aware that the mass education has led to demand for a greater public accountability. Both government and society would like institutions to demonstrate that the institutions receive the funding and be able to delivery quality products. For this reason, this paper would like to present the internal audit within the institution. The purpose of establishment of internal quality audit is to review the institution's capability to award degrees, to maintain standards, and to be responsible for quality degree programs. There is a believe that the internal quality audit is the heart of the quality education as far as the educational research goes.

For a successful implementation of internal audit, it is important to train everyone in the institution to understand the concept of ISO 9000 such as, what they are, how to establish quality system, how to audit such quality system, how to choose the auditor, what the auditor's roles and responsibilities are.

Training

For higher educational institutions to put the internal quality audit in place, there is a need to establish the awareness and understanding of all members of institutions by training. It is important to have them understand why quality system is needed in the first place. Then, making them to understand the policy such as the academic excellence, or international acceptance and objective such as the following :

- ☐ Establish a system for assuring the quality of their graduates
- ☐ Reduce costs by improving teaching-learning processes.
- ☐ Facilitate their processes for increasing prospective students qualification
- ☐ Improve their position in the educational marketplace (particularly the international market)

Training will hopefully establish participative quality culture that encourage faculty and staff of institutions work efficiently

and effectively toward the academic excellence. If the quality culture occurs, it will create conducive working environment, positive working culture by means of promotion, recognition and good relation for better education.

Working Group Establishment

The institution must establish a working group to setup it's quality management system. The working group should have two level: the institutional level and the faculty level.

The institutional quality working group should consist of the technical vice-president as a chair person with the deans from all faculties or their representatives. The functions of this working group are as following:

- ☐ establish the quality policy, plan and academic criteria,
- ☐ prepare the audit report for the external auditors;
- ☐ yearly review of the institutional quality management system;
- ☐ assist in all institutional improvement ;
- ☐ review of mechanisms and structures used by institution to monitor, assure, promote and enhance the academic quality;
- ☐ appoint a person to act as quality management representative to coordinate and follow-up quality system.

The working group at the faculty level should have the following functions:

- ☐ establish quality management system;
- ☐ encourage everyone in the faculty works toward the quality of education; and
- ☐ write a quality internal audit report

Requirements for Quality Education

There are twenty requirements in the ISO 9000. Some of them are not easy to apply to teaching and learning. In addition, some requirements are changed to fit in the field of education.

1. Structure of Organisation

As mentioned before, the institution should establish two levels of working group, the institution working group and the faculty level working group. The quality management representative should also be appointed. Policy must be in written form which everyone can understand clearly. The policy must be signed by the president. This requirement also includes resource and management review.

2. Quality system

The working group at each level should establish quality system that comprises of quality manual, procedure manual, work instruction, and document. Quality system may include :

- ☐ Institutional policy and policy of each faculty
- ☐ monitoring and measurement
- ☐ written functions and procedures

Those items are critical for the appropriateness of higher education. The declaration of policy at every level should be done officially and publicly. It is the responsibility of management to devise, promulgate, and monitor the system. In addition, some essential questions are determined such as selecting the appropriate application of ISO 9000 to higher education and work out through details, how the curriculum is designed, how students are

recruited, how students' achievement is evaluated and how curriculum is assessed.

3. Role & Responsibility to the society

The institutions should review their policy and responsibility in the areas of production, research, academic service and culture preservation. The institution is accountable to its students and society.

4. Design control

The institution should improve and develop their four main functions (production, research, academic service and cultural preservation). The institution should have manpower planning and enough resource for an effective design system. The institution should have a system to monitor and measure the effective way to work.

The design system is to verify the students' needs and develop to meet their needs. This may include course plan, handouts, learning materials and curriculum assessment.

5. Document control

The institution should have document control covering document and database system launching from a number of student identification, teaching workload, course works and programs. It will provide confidence that the institution has updated documents and been able to check the document, issue, and data approval.

6. Purchasing

The institution should consider the criteria to purchase resources, such as learning materials, and hiring part-time instructors.

In addition, the institution should determine job specification, job procedure, job service that can control, monitor, and assess.

7. Control of Supplied Product

The institution should be responsible for controlling and maintaining all learning materials, teaching-learning equipment, and training program. In case, there is a damage, it needs to keep record and report.

8. Student Database and Monitoring

The institution should have database of student, graduates and academic service including student selection, teaching learning process, student progress. Database of academic service should start from job responsibility, process, and monitoring so that it can be identified.

9. Process Control and Service

The institution should have quality control plan for students and other academic services to assure the quality. The quality plan will include documentation, work condition, quality standards and measurement.

10. Checking and Testing

The institution should determine the process of checking and testing step by step, including teaching-learning process and academic service. The institution should receive the inspection, testing and inprocess inspection.

11. Testing Control and Testing Equipment

All equipments for teaching and learning should be registered to assure work accuracy, including how to use, how to fix and how to maintain.

12. Inspection and Test Status

The institution should determine the system of testing for students so that they can monitor all activities related to teaching-learning process.

13. Control of Nonconforming Product/Service

The institution should review the document of nonconforming product and disposition of such product or learning materials such as curriculum development and student achievement.

14. Corrective and Preventive Action

The institution should specify the system or activities for corrective action and show how the monitoring and evaluation system work. For instance, students or their parents are able to provide feedback and the institution will review that action.

15. Job Finding and Further Education

The institution should determine its activities regarding job placement, hiring, and further education. It should also determine the process to see whether the graduates are in progress, and the academic service is satisfied to students' needs.

16. Quality Records

The institution should determine the process and procedure of data record. It is an auditing record to see that the procedure has or has not been followed. It is to introduce a quality system that specifies numerous new and complex records, which will have to be kept as quality records.

17. Internal Quality Audit

The institution should determine the internal quality audit launching from audit planning, activities and process. All noncompliances have to be corrected. The process of adjusting a noncompliance is called corrective action.

18. Staff Development

The institution should have staff development plan at all level. It can be training, on-the-job-training, and further education. It should also monitor on staff performance.

19. Further Education and Academic Service

The institution should determine further education and academic service for graduates, alumni, outsiders with training and seminar after the study.

20. Statistical Technique

The institution should determine statistical technique for analyze, control and compliance to each quality process. The records should also be consistent with the labor market, researcher and academic service.

In addition to the ISO 9000 requirements, author needs to add two more requirements which will make the institution to serve better in the area of academic and management. They are **Academic Excellence** and **Budgeting**. The institution should determine the way to develop its' intelligence, knowledge, teaching-learning process in order to be comparable to international standards for academic excellence. It should also determine to improve the budgeting process.

Educational Quality Management

The institution can borrow the quality management from ISO 9000 to apply for higher education as an approach to the achievement of quality. It should involve quality planning, control and assurance

Quality Planning is a plan to serve customer satisfaction and objectives of organisations. In order to do so, some factors have been involved, such as policy, procedures and products. In higher education, the institution should begin with planning for quality. The plan will assist working by direction in both short and long-term plans.

Quality Control refers to mechanism and activities to ensure that the academic standard is achieved. In ISO 9000, the quality control is the operational technique employed in the manufacture to fulfill requirements and maintain standards. The components of quality control comprise quality manual, procedure, work instruction and documentation. As the higher education institution places the mechanism to control quality, it must have at least quality manual providing a framework and a mission statement expressing its purpose and direction. In some cases, it can incorporate or be accompanied by statements of the institution's values.

Quality Assurance is the activities and procedures to ensure that quality of education is maintained and improved. It needs to work out through quality planning and control.

Quality Assurance = Quality Planning + Quality Control

The activities require the internal actions of institution with the involvement of internal and external body.

Educational Auditing Process

Auditing process is a process to install measurement which will inform management whether the system is being effective. The components of auditing process are self-studying, meeting of auditors, site visiting and reporting.

a. **Self-study** is the self-review. The self-study must contain the academic criteria provided by educational authorities. They have proposed 9 aspects of higher education criteria to be assured that the institution is doing a competent job for their productivity. The nine aspects are mission, teaching-learning, student recreational activities, research, academic service, preservations of arts and culture, administration, budgeting, quality assurance and enhancement. The self-study report is needed and it should contain the following items :

- ☐ a summary of the institution's statement of mission and objectives
- ☐ a description of the quality assurance process, and outcomes
- ☐ nine aspects of higher education criteria
- ☐ summary of quality assurance arrangement and system with examples of their effectiveness in operations
- ☐ main document contain references to the appendices
- ☐ supporting material and additional material as appropriate

- ☐ appendices with factual data and information and cross-referenced to the main document

- ☐ supporting material (the charter, calendar and current annual report)

- ☐ additional materials such as report of committee review, standard forms, questionnaires and special arrangement

In sum, the self-study report starts from the institutional mission to outlining the institutional quality system and its effectiveness.

After the self-study report had been submitted to the auditor team, the auditors examine the report to determine the reliability and effectiveness of the quality system

b. Meeting of Auditors

Auditors should get to know each other, share idea, knowledge and experience. Meeting of auditors will make them understand the purpose of auditing and be familiar with the auditing procedure. Some issues may be discussed for further investigation. Auditor team may plan a site visit, an interview and observing the classroom teaching-learning process. The audit team actually consists of 3-5 members. One will serve as a lead auditor and other auditors will be educational experts. During site visit, the institution would have an opportunity to clarify its roles and responsibilities. Site visit will be useful for the audit team to decide whether the quality management system is practically existing and maintained. It would also be beneficial to institution to ensure its compliance to the requirements of ISO 9000. The auditors may

ask some questions during visiting. Examples of questions are :

- ☐ What quality system does the institution have in place?

- ☐ How effective is it?

- ☐ How does the institution measure the quality outcomes?

- ☐ What are the institutional priorities for improvement?

c. Site Visit

The purpose of visiting is to see whether the institution did what it wrote in the self-study report. A visit allows a qualitative assessment of factors that cannot easily be documented in written form such as students' attitudes, intellectual atmosphere and staff's morale.

Executives of the institution will meet the audit team a day before a visit. It will be helpful for both sides to know each other. The executives have an opportunity to learn whether the auditing team would have in mind, what they would like to see, do and interview. Then, the institution can make some arrangements. In addition, the visiting schedule must be flexible to give the institution enough time to provide further information and further interview.

d. Reporting

After the visit, the audit team will write a report based on what they found on their visit. The audit team will conduct an intensive meeting to discuss and share the findings. The report will outline the findings

and any suggestions and recommendations for the institution including strength and weakness. The report must be written without vague or unsubstantiated statements. If the audit team found something impressive, it must collect concrete evidence to support the statements.

External Auditor Qualification

Auditor should be trained. In training session, auditors will learn their roles and responsibilities that include the 9 quality aspects.

The characteristics of auditor should be divided into three aspects as following :

1. **Quality audit aspect** -commitment to principles of quality audit and quality assurance, knowledge of quality assurance method, and experience of audit and assessment

2. **Higher education aspect**-experience of teaching and learning and knowledge of higher education.

3. **General aspect**-experience in managerial position

The auditor must have ability to focus knowledge and experience to evaluate quality assurance procedures and techniques, ability to work as a team, breadth of perspective, discretion, and commitment.

The lead auditor must create an atmosphere in which critical professional

discussion can take place, where opinions can be freely exchanged and in which justice and clarity prevail to encourage members to do the work as a team-he or she should introduce the team members to know each other because it is important for the tone of the meeting

Summary

ISO 9000 is a series of quality standards and guidelines. It is launched by the Technical Committee 176 in 1979. It is dealing with the quality principles, the ISO requirements, a quality system, and internal quality audit, including auditor qualification and internal quality audit cycle

Eventhough the ISO 9000 standard's background is in manufacturing, this paper has tried to show the relevant of its principle in the area of internal quality audit applicable to higher education. It's procedure of internal audit can be adapted for the benefit of teaching-learning process. This paper is explained and analyzed several aspects such as what criteria of educational standards are measured, how many steps to create a quality control, what the auditor qualifications and auditing processes are. These processes are very important to quality management system to build quality assurance for productivity and effectiveness of teaching learning process.

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