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A systems approach to program evaluation model for quality in higher education

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Abstract

Purpose – To propose an evaluation model for the quality implementations in higher education through an analysis of quality systems and program evaluation using a systems approach.

Design/methodology/approach – Theoretical background, research and practice of the quality systems in higher education and program evaluation are analysed in conjunction with the concepts of systems approach. The analysis leads to a systems approach-based program-evaluation model for quality implementation in higher education.

Findings – The three concepts, quality systems in higher education, program evaluation and systems approach, are found to be consistent and compatible with one another with regard to the goals and organizational structure of the higher education institutions. The proposed evaluation model provides a new perspective for higher education management for the effective and efficient implementation of the quality systems and program improvement.

Research limitations/implications – The implementation of the model in a real university setting is necessary for the clarification of the processes.

Practical implications – The study provides a constructive analysis of higher-education-related concepts, and a new dimension of quality systems and program evaluation is developed in the model. The approach comprises three subsystems; "social system", "technical systems", and "managerial system". The evaluation of quality in higher education requires inquiry of the components of the systems.

Originality/value – This paper proposes an innovative evaluation model integrating the systems approach into quality tools. The model is claimed to be the first in integrating the three approaches.

Keywords Higher education, Baldrige Award, Quality, Quality assurance

Paper type Research paper

Background

In recent years, a need for a renewed focus on higher education has been felt. Universities seek more effective systems to address the increasing dissatisfaction with the performance of higher education systems.

In educational terms, there has been a shift away from traditional models in which most students might have been viewed as passive recipients of teaching, absorbing information in an uncritical way, to a growing enthusiasm for active, independent learning, which encourages deep, rather than superficial processing of information.

In response to the necessity for reforming higher education system in line with the needs and expectations of the community and business sector, new approaches and practices in management and industry have appealed to the decision makers of higher education. Increased use of quality systems in the higher education context has made a profound impact in the areas of administration, teaching and research. Incorporated with quality assurance and accreditation systems, the concepts of internationalism and

Quality Assurance in Education
Vol. 14 No. 1, 2006
pp. 37-53

0968-4883
DOI 10.1108/09684880610643601

competitiveness of the higher education institutions have also brought about new dimensions.

As governments in most parts of the world have considered their agenda for higher education over the last few decades, issues of quality assurance and quality enhancement have acquired a major focus of attention. Despite differences in the size and stage of development of their higher education sectors, many governments have decided that traditional academic controls are inadequate to today's challenges and that more explicit assurances about quality are needed. Organizations such as the European Commission or OECD have reinforced this trend by their own calls for new structures and new approaches to quality assurance (El-Khawas, 1998).

Quality systems in higher education

As a result of growing interest in quality systems as a means of accreditation and accountability in higher education, conceptions and approaches to quality are being reviewed in various ways for numerous contexts of national and international interests. In this trend, the concept of quality has been defined in several ways as (Campell and Rozsnayi, 2002, pp. 19–20):

- *Quality as excellence*. This definition is considered to be the traditional academic view that holds as its goal to be the best.
- *Quality as zero errors*. This is defined most easily in mass industry in which product specifications can be established in detail, and standardized measurements of uniform products can show conformity to them. As the products of higher education, the graduates, are not expected to be identical, this view is not always considered to be applicable to higher education.
- *Quality as fitness for purposes*. This approach requires that the product or service has conformity with customer needs, requirements, or desires.
- *Quality as transformation*. This concept focuses firmly on the learners: the better the higher education institution, the more it achieves the goal of empowering students with specific skills, knowledge and attitudes which enable them to live and work in the knowledge society.
- *Quality as threshold*. Defining a threshold for quality means setting certain norms and criteria. Any institution that reaches these norms and criteria is deemed to be of quality.
- *Quality as value for money*. The notion of accountability is central to this definition of quality with accountability being based on the need for restraint in public expenditure.
- *Quality as enhancement or improvement*. This concept emphasizes the pursuit of continuous improvement and is predicated on the notion that achieving quality is central to the academic ethos and that it is academics themselves who know best what quality is at any point in time.

The definitions stem from different approaches, and reflect different implementations. When implemented in the higher education contexts the industry focused quality measures present significant limitations. Therefore, the reflection of the quality concept into higher education has long been the debate in the academic contexts

(Harvey and Green, 1993; El-Khawas, 1998; Birnbaum and Deshotels, 1999; Campell and Rozsnyani, 2002). The term quality, as used in industry and business, needed to be re-defined relevant to the higher education context. One way to fulfil this is to approach it through scientific methods.

Two of the advocates of appropriateness issue are Lewis and Smith (1994). In their book, after the discussion of the issue, they exemplify the implementation of quality principles at Ohio State University (Lewis and Smith, 1994, pp. 32-33). According to them, principles and concepts of quality are compatible with the best tradition and practices of higher education. The underlying philosophy, values, and norms reflected in quality systems are appropriate to higher education. These include:

- an emphasis on service;
- anticipating and meeting the needs and expectations of the constituents;
- recognizing and improving transformation processes and systems;
- implementing teamwork and collaboration;
- instituting management based on leadership, knowledge-based decisions, and involvement;
- solving problems based on systematic identification of facts and the use of feedback systems and statistical methods or tools; and
- implementing a genuine respect for and development of human resources – the people who work in colleges and universities.

In order to seek a re-definition and to develop a set of criteria for quality in higher education, Harvey and Green (1993) developed a methodology for assessing quality. Focusing on the identification of certain criteria to assess the quality of teaching and learning rather than administrative matters, they aimed at redefining the policy on quality. The groups of stakeholders that they addressed are students, teaching staff, non-teaching staff, employers, accrediting agencies, quality assurers, quality assessors and the government. Through a set of multiple data collection procedures involving survey, in-depth interviews and discussion seminars, they found out that the majority of the groups agree on the following criteria:

- adequacy of physical resources;
- adequacy of human resources;
- clarity of the aims and objectives to all participants;
- relevance of subjects and their content to programme's aims and objectives;
- active student participation in all levels;
- relevance of the programme content to the award given;
- objectivity in assessment;
- consistency between assessment and course objectives;
- getting useful feedback from assessment; and
- providing students with transferable knowledge and skills.

A widely used model in higher education settings is the Malcolm Baldrige Quality Award, which recognizes quality improvement, generally as applicable to

manufacturing, service, and small business. The primary goal of the Baldrige Award is customer satisfaction. The award criteria reflect the following categories (Moore, 1996): leadership, information analysis, strategic quality planning, human resource development and management, management of process quality, quality and operational results, and customer focus and satisfaction. In other words, accountability and evaluation are integrated into institutional systems (Kezar, 1999). Several studies have focused on service quality evaluation using service quality models (O'Neill and Palmer, 2004).

Existing systems of quality assurance and accreditation incorporate evaluation through program reviews (Ostroth and Turrentine, 2000). Similarly, the organizational excellence models such as Rutgers Model (Rutgers, 2004) incorporate a focus on evaluating institutional self-assessment. The model emphasizes a focus on approaches, implementation strategies, and outcomes that translate readily into strategic plans with clearly identified improvement priorities, goals and action steps. The implementation of the model has also proven effective in encouraging cross-departmental and cross-institutional strategies for heightening awareness of common issues, raising standards and expectations of performance, and facilitating communication and collaboration among, and within universities based on a common understanding of key values and concepts.

In general, the core values have been learning-centred education, leadership, continuous improvement, faculty and staff participation, partnership development, design quality and development, management by statistical data and results orientation while focusing on the processes.

Quality systems adapted from business and industry operations need to be reoriented, and reinstalled for higher education conditions to turn the focus from the management-based to the education-based practices. One way to do this is to evaluate the system's effectiveness through a set of activities based on the concepts of educational evaluation. Thus, judgements and decision-making should precede evaluative activities.

Although much has been investigated about "quality management systems", emphasizing management and process assessment, there seems to be dissatisfaction with the educational evaluation through the framework of program effectiveness and assessment. Similarly, the new systems' effectiveness, and even appropriateness, to the needs in terms of educational processes and program applications remain open to be investigated. Educational practices like instructional implementation, design, program, methods, students, courses and faculty components are not included, in depth, in the assessment systems. In relation to the evaluation of the new system with respect to the dimensions of program evaluation, there seems to be a lack of research. The systems adopted for quality usually ignore the program evaluation aspect. In this sense, an evaluation system including a deep analysis of these issues needs to be developed.

One concern, over and above any other, related to quality systems is the lack of a program evaluation dimension. In spite of the common use of quality systems in higher education, the argument is that the concept of quality has not extended to curriculum content (Wolverton, 1994, Motwani and Kumar, 1997; Birnbaum and Deshotels, 1999). Most of the studies demonstrate the patterns of program evaluation, yet, without referring the concept of program evaluation as a comprehensive term.

Originally, the application of quality systems in higher education required a systematic evaluation of all aspects related to processes. However, the existing quality approaches and uses of program reviews seem to lack a way of developing an explanatory and an adequate model. The underlying issues stem from the fact that implementation and assessment models of quality systems in education are forms of industry based concepts, which might lead to situations in which educational aspects may remain unattended.

Program evaluation models alone are unlikely to lead the assessment of quality implementation. However; they focus on systematic data collection about the program, and present merits and weaknesses to allow judgment for decision-making.

Program evaluation

Program evaluation can be defined as a systematic operation of varying complexity involving data collection, observations and analyses, and culminating in a value judgement with regard to the quality of the program being evaluated, considered in its entirety, or through one or more of its components.

Evaluation is the means of arriving at a value judgement on the basis of measures (qualitative or quantitative) considered to be valid and reliable, which compare the actual results of a program with its anticipated results. Even where evaluation is concerned with assessing intangible situations, which are difficult to measure, it must, to be credible, be based on data gathered in a rigorous and objective manner (Rossi, 1985, p. 85).

The first step in program evaluation is to define the subject of the evaluation. To that end, a definition must be made of what a program and what a subprogram is. A program is a coherent, organized and structured whole, composed of objectives, activities and means.

Program evaluation is crucial for determining how, and to what extent, quality improvement systems are effective in educational practices and outcomes. Standards against which program, course objectives, teaching-learning practices, needs and learning outcomes will be assessed need to be established, and integrated into the evaluation system. To do this, besides statistical analysis and documentation processing, qualitative research methods for program evaluation should also be used in order to provide deeper analysis and information.

It often helps to think of programs in terms of inputs, processes, outputs and outcomes. Inputs are the various resources needed to run the program, e.g. money, facilities, customers, clients, program staff, etc. The processes are how the program is carried out, e.g. customers are served, clients are counselled, students are taught, knowledge is delivered, parent associations members are supported, etc. The outputs are the units of service, e.g. number of customers serviced, number of clients counselled, students taught, research work produced, and employers, community and other groups communicated with etc. Outcomes are the impacts on the customers or on clients receiving services, e.g. increased employability and job satisfaction of graduates; reputation of the university in society; increased mental health, safe and secure development, richer artistic appreciation, among the staff members, etc.

Program evaluation should be considered as being beyond a measurement tool used in quality assessment systems. It suggests higher education as a system; it offers a systematic, scheduled and focused examination of the control of quality. It also offers the stakeholders a definition of quality for their own program; and the institution, a

systematic examination of mission and the goals; application of professional standards; statements of qualitative as well as quantitative aspects of the program through data collection. Program evaluation is related to the technique of quality assurance.

Management orientation in program evaluation

Since the systems approach suggests an organizational understanding, its conformity to management-oriented (also decision-oriented) evaluation approaches needs to be maintained. The management-oriented evaluation approach serves the decision-makers. The information gathered from evaluation is crucial for administrators, policy-makers, school boards, teachers and other stakeholders.

The models developed involve a systems approach to education in which decisions are made about inputs, processes, and outputs. Stufflebeam (in Worthen and Sanders, 1973, pp. 120-122) develops an evaluation framework (context, input, process, and product) to serve managers and administrators facing four different kinds of educational decisions:

(1) *Context evaluation*, to serve the planning decisions. Determining what needs are to be addressed in an educational program, defining the objectives.

(2) *Input evaluation*, to serve the structuring decisions. Determining what resources are available, what alternative strategies for the program should be considered, and what plan seems to have the best potential for meeting needs facilitates design of program procedures.

(3) *Process evaluation*, to serve the implementation decisions. How well is the plan being implemented? What barriers threaten its success? What revisions are needed? Once these questions are answered, procedures can be monitored, controlled and refined.

(4) *Product evaluation*, to serve recycling decisions. What results were obtained? How well were needs deduced? What should be done with the program after it has run its course? These questions are important in judging program attainments.

The above-mentioned model is similar to the model developed in this study in two aspects:

(1) both rely on the systems approach to education – i.e. considering education as a system; and

(2) both involve inputs, processes and outputs as the aspects to be evaluated in an evaluation study.

Quality as a systems approach is used especially in the context of higher education. According to the systems approach, the core elements of program evaluation should be analysed in input, process and output stages. However, the quality approaches differ in terms of the concepts of management and program, emphases given to customer satisfaction, data sources and decision-orientation. Thus, it makes a difference to the audience of the management-oriented evaluation (i.e. the decision makers, managers and administrators), and the systems approach evaluation model (which covers all stakeholders including decision makers, managers and administrators). According to the model, quality movement in higher education is preceded by establishing social,

technical and managerial systems simultaneously. Thus, the evaluation of quality implementation in higher education requires an inquiry into these systems components simultaneously (Figure 1).

Systems approach

The systems approach integrates the analytical and synthetic methods, encompassing both holism and reductionism. It was first proposed with the concept of "General system theory" by the biologist Ludwig von Bertalanffy (1969). General systems theory is based on the assumption that there are universal principles of organization, which hold true for all systems.

The basic principle of the systems theory is that the whole is more than the sum of its parts, that the whole determines the nature of the parts, and the parts are dynamically interrelated and cannot be understood in isolation from the whole. Systems are regarded having four major characteristics (Banathy, 2000):

(1) systems are goal oriented;

(2) systems have inputs from their environment;

(3) systems have outputs to achieve their goals; and

(4) there is feedback from the environment about the output.

The system can be composed of subsystems as well as units or parts making the whole interaction. Once organized, a system is not simply a collection of parts but a functional entity that has properties that cannot exist independently as a collection of parts.

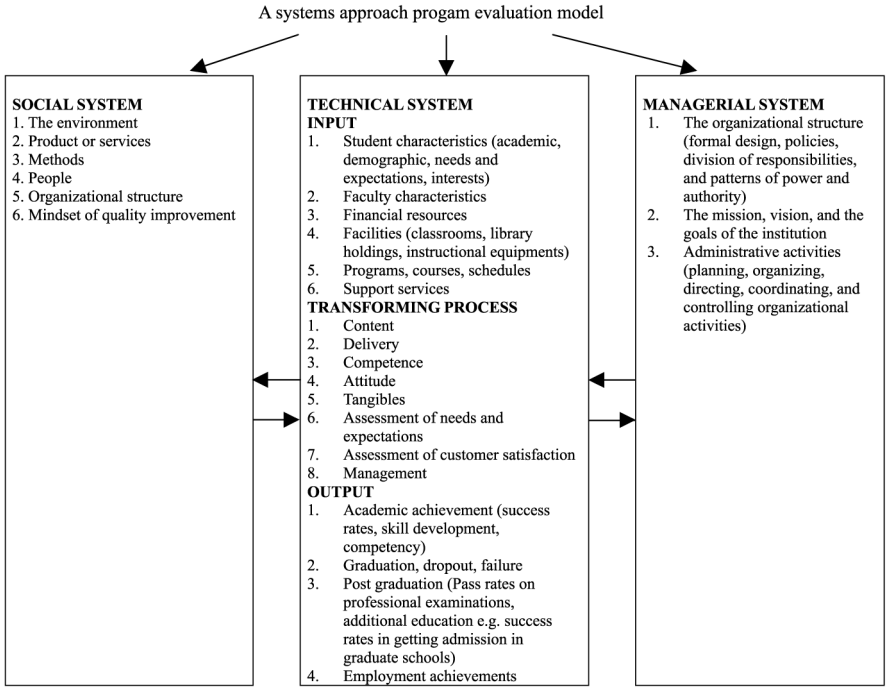

Figure 1.
A systems approach program evaluation model for quality in higher education

In order to be a functioning system, the total system has to define its objectives and performance measures; the environment has to be considered as an influencing factor; the resources must be determined; the components of the system must be defined; and the management of the system must be set (Churchman, 1968).

Relevance to quality and program evaluation in higher education

A higher education organization in relation with the quality systems and its program designs proves to be a system as it is holistic, open, continuously changing, interactive and with embedded features. Quality systems recognized by the higher education institutions view the whole organization as a system. Quality approaches suggest that organizations are the systems which essentially consists of input, transformation and output components. Higher education institutions embracing quality systems are viewed in the framework of a systems approach. Program evaluation suggests a systematic and comprehensive evaluative approach viewing the school organization as an entire system with its programs and functions in practice.

Both quality and program evaluation theories are based on a holistic approach that incorporates all aspects: functions and forces of a higher education organization, which have interactions and impact on each other.

Also as open systems the higher education institutions are exposed to external interaction and influences that are the adaptation of external quality accreditation systems, and interaction with other external systems such as labour market and society, through which they can acquire new properties. They cannot survive without continuous interaction; this is reflected in the input, the transformation and the output stages. The system is not just a passive mechanism; but an active processor. If the components do not interact effectively and efficiently, the whole system exists only as a sum of its pieces, which is not an open system (Banathy, 2000). Internal processes are the concern of quality assurance systems, while the interaction among the subsystems inputs (e.g. financial resources and curriculum designs), transformation (e.g. methods of delivery) and outputs (e.g. professional qualifications) are the interests of program evaluation.

In many cases of quality implementation, the internal interactions among the subsystems are ignored. For example, the interaction and interrelatedness between the entry characteristics of the students and the course qualifications are not included in the standardization processes. It is considered sufficient to know the total numbers of, e.g. enrolment and graduation rates. Hence, the quality implementations, considered from a systems approach and program evaluation point of view, can enhance their utility and effectiveness.

The rules governing the higher education systems constrain or cause the function of the subsystems. Here, setting objectives and planning processes have an impact on the processes and outputs. For example, the educational policies on, for example, internationalisation, directly affect the behaviour of a given higher education institution. The quality accreditation and assurance with a systems approach focus accommodates this external influence. That is, each system is open to external influences, which have to interact with aspects of the system.

It is also worth referring to the super systems in which the higher education institutions function. Each system is embedded in a super system, which holds all the higher education institutions together. The embeddedness of systems can occur in a higher system through, for example, national education system and/or international

(global) systems of higher education. It is obvious that a higher education institution has to get embedded into the international system of higher education in terms of being influenced by the recent challenges, e.g. competitiveness, mobility and international trends.

The systems approach to quality and program evaluation accommodates a complementary view to the evaluation of quality implementation. Quality would provide feedback for itself through the systems approach, with continuous evaluation and feedback aspects of its systems.

The system level evaluation of the program is crucial to determine whether the stakeholders' and the system level needs are being addressed, and to identify opportunities to improve efficiency in existing programs (Gates *et al.*, 2002). Although the main task of quality assessment focuses on the quality and productivity of specific providers of education and professional development, the study found that a higher-level assessment of the system as a whole is also crucial.

Model development

There are two main points that need to be considered when approaching an evaluation model for quality systems:

(1) an evaluative approach should be adopted in the quality systems regarding higher education as a system; and

(2) definitions of program evaluation and implementation should be done with quality concepts.

Then using the quality system assessment tools and the program evaluation approach the effectiveness of the programs are measured. Then the system will contribute to the decisions about the program installation or continuation, and, expansion or certification. From an evaluation point of view, the system will consider program components such as needs analysis, objectives, courses, course objectives and designs, instruction (teaching-learning strategies and methods, instructional materials), learning outcomes and assessment, and evaluation strategies.

In the light of these assumptions, in the following section, a theory-based program evaluation model for quality in higher education is introduced.

This model was designed on the basis of the demand emerging from the quality implementation in a university setting. It has been observed that quality approaches and their implementation in the academic contexts result in some questions being left unanswered (Lewis and Smith, 1994; Birnbaum and Deshotels, 1999). From the perspective of program evaluation, these raise a number of questions concerning quality systems. Their discussion focused the questions of "to what extent the quality improvement practices provide optimal student learning and achievement of the goals" and "to what extent they are associated with program evaluation." They have been the main starting points leading into the model development process. Lack of teaching and learning focus and analysis of educational processes in the industry based quality systems leave gaps in implementing the quality systems in higher education. The quality standards higher education institutions are to meet are provided a limited focus in the main educational aims of the institutions. Applied loosely in a higher education context, the idea of program evaluation from the perspective of quality assurance systems is the basic approach of this study.

The systems approach evaluation model

In developing the "theory-based program evaluation model for quality" a combination of different approaches was used. There are two underlying approaches. The first is the proposed, "systems approach" developed by Tribus (1990) based upon Deming's teachings. According to this approach total quality must be seen as a combination of three separate systems:

(1) a social system;

(2) a technical system; and

(3) a management system.

And also, the premise is that higher education itself is considered as a system with its inputs, processes and outputs. The second approach is the higher education application framework. Lewis and Smith (1994) explain these "program" operations as transformation processes that involve:

- inputs to the organization from the external environment;
- throughputs or the actual techniques (methods) used to transform (add value to) the inputs; and
- outputs represented by the product and/or service provided to members of the external environment.

This transformation process is reflected in the technical system. A technical system for a higher education institution involves inputs and methods that transform the inputs into outputs. Thus the integrated form of these two ideas leads to the model.

The model involves the quality concepts adapted to educational institutions. Each component is carefully examined, in the sense that its appropriateness to higher education and researchability in the evaluation process are determined. Similarly, attainability, reasonability and practicality of each item are also taken into consideration. The focus was kept on the program and the instructional operations.

The model identifies three subsystems functioning internally, and being affected by external quality assurance systems and the criteria that emerged from other external factors such as society and labour market. The criteria referred to here are the ones used in the ISO 9000 accreditation system, Malcolm Baldrige award criteria and Deming's quality management systems. The entire system is open to internal interactions and external influences. The relationships are analysed using a program evaluation approach. Quality implementations are described in relation to the subsystems for achieving the overall goals. Subsystems are set up for developing systematic evaluation and methods for the analysis of, e.g. social, technical and managerial processes in the given institution. This requires, for the higher education institutions, a new way of thinking that considers the interactions between the quality system and program evaluation from the perspective of a systems approach, so that the goal setting and planning processes could be established in that direction. Such an interaction entails the integration of program evaluation approaches and methods into the quality implementation processes in a systematic way. For example, as the outcomes of quality implementation, self-evaluation reports, internal and external controls should integrate the program evaluation implementation into the system and the results must be one of the indicators for the quality system.

Subsystems have impacts on other subsystems. This requires new ways of thinking and problem solving as the subsystems have continuous interaction. For example, involvement of academic staff and students in managerial issues and decision making processes, and labour market-university collaboration, e.g. use of labour market needs assessment studies, in course designs and curriculum reviews represents the interaction among subsystems and requires a new way of thinking in the conventional institutions. This model is presented using a program evaluation approach and a quality systems approach in the ISO 9000 accreditation system, Malcolm Baldrige award criteria or Deming's quality management systems. The three subsystems that make up the model are: social, technical and managerial systems. The interactions within the sub-systems influence the whole mechanism in the above-mentioned holistic way.

In this system the whole follows a plan and sets the rules as illustrated in the model and the associated subsystems. Subsystems are organized to interact and influence the entire system. The concepts of quality and program evaluation are regarded as functioning separately in many of the previous implementations. For example, program evaluation approaches such as the CIPP (Worthen and Sanders, 1973) model have no focus on the quality systems while the quality systems such as Malcolm Baldrige Criteria (Moore, 1996) implemented in higher education do not directly refer to program evaluation. However, the two systems have their own dynamics simultaneously with the other and they must function in harmony. The model, when implemented in the higher education context, would fully bring about the right organizational mindset: setting up quality assurance systems or curriculum reviews, which will bring about integrated and systemic practices (Figure 1). The components of the model are discussed as follows.

The social system

According to the model, the social system requires a culture change in organizational culture (the values, norms, attitudes and role expectations); communications (quality of relationships between individual members and among groups, reward structure, symbols of power etc.); and behavioural patterns.

Among the characteristics of the social system, are customer satisfaction, continuous improvement, management based on facts, and respect for people. In higher education, this requires a substantial change in the traditional system and culture. In order to achieve a culture change, six areas must be recognized (Lewis and Smith, 1994):

(1) the environment;

(2) product or services;

(3) methods;

(4) people;

(5) organizational structure; and

(6) mindset of quality improvement.

The technical system

In industrial and business terms, the technical system includes all the tools and machinery and quantitative aspects of quality, and its inputs and outputs. In higher

education, it is concerned with the flow of work. Fulfilment of mission and service to customers are the two core elements. The technical system includes a transformation process as the "interaction" among the input, resources and output. This involves, three elements explained as follows (Lewis and Smith, 1994):

(1) *Inputs*:
- student characteristics (academic, demographic, needs and expectations, interests);
- faculty characteristics;
- financial resources (sufficient, effectively used?);
- facilities (classrooms, library holdings, instructional equipments); and
- programs, curriculum, courses, schedules;
- support services (canteen, recreation, food, transportation etc.).

(2) *Transformation process*:
- design (courses, programs, schedules, inputs, class size);
- delivery (methods to deliver course material to the students);
- measurement of the outputs (number and frequency of quizzes, assignments and examinations); and
- evaluation of the program, the courses and the professors (student surveys, alumni, parents, employers).

(3) *Outputs*:
- academic achievement (success rates, skill development, competency);
- graduation, dropout, failure;
- post graduation (pass rates on professional examinations, additional education, e.g. success rates in getting admission in graduate schools); and
- employment achievements (employer satisfaction).

The managerial system

Management provides the framework for the policies, procedures, practices, and leadership of the organisation. The managerial system includes the issues related to:

- the organizational structure (formal design, policies, division of responsibilities, and patterns of power and authority);
- the mission, vision, and the goals of the institution; and
- administrative activities (planning, organizing, directing, coordinating, and controlling organizational activities) (Lewis and Smith, 1994).

Although the model appears to be sequential, it must be emphasized that it is not the case. Without reference to the managerial system, for example, the evaluation process in the technical system cannot be undertaken. Especially those institutions, whose focus is program improvement, and which provide quality via program evaluation, would focus on the transforming system (Mizikaci and Aksu, 2002). However, since subsystems are interlinked, it is suggested that all three subsystems be considered in longitudinal studies.

Illustration

To illustrate the interaction of the subsystems in a university setting, a hypothetical situation is developed. A national quality assurance system is to be adopted in the program accreditation level. After a taskforce team communicates the framework, the institution sets the objectives and plans for the implementation of the processes. Accordingly, in order to incorporate program evaluation dimension, the quality accreditation requirements should be set with the following criteria:

(1) *Set criteria for program evaluation*:
   - The criteria and the programme are based on the quality concepts re-defined accordingly, representing a shift from industry-based concepts to education-based concepts and issues for higher education.
   - Adopt the systems approach model in order to set the strategies for the program.

(2) *Stakeholder identification*:
   - Define the stakeholders as those that have an influence directly or indirectly on higher education of the programs such as students, academic staff, administration, parents, graduates, employers, Higher Education Council, Ministry of Education and other related institutions.
   - Conduct a survey to define the needs and expectations of the stakeholders.

(3) *Sector analysis*:
   - Analyse inputs sources, e.g. the graduates and trained personnel in the employment market. Analyse performance skills and knowledge expected from trained employees.
   - Analyse existing employment sources embedded in the community which can have indirect influence on higher education, e.g. public offices and non-governmental institutions, other national and international bodies of research and education.

(4) *Identification of resources*:
   - Identify what resources are available.
   - Identify whether the resources are appropriate to the objectives defined.
   - Analyse cost-effectiveness.

(5) *Data gathering*:
   - Research statistical data, e.g. unemployment rates and household percentages.
   - Gather data from multiple sources.
   - Gather both qualitative and quantitative data.
   - Use statistical methods and data analysis procedures.
   - Adopt a systematic data collection procedure (collect, analyse, interpret and make use of data systematically).

(6) *Programme development*:
   - Plan all the stages identified in the technical system of the model.
   - Make use of quality measurement tools in planning instructional processes.

- Make use of relevant educational research on planning teaching/learning processes.
- Make use of technologies when planning instructional material.
- Emphasize frequent feedback and evaluation.
- Plan continuous education strategies.
- Adopt suitable evaluation strategies for programme improvement.

As can be seen here, each criterion provides for the implementation of the model components and directs the data interrelated to the sub-system components: social, technical and managerial systems. For example, any undertaking for the elements of the social system has a reference to and provides a feedback to the elements of the technical system, e.g. which environmental conditions would provide better learning outcomes etc. This is the concern of any quality system as one of its basic questions. Similarly, the output data from the technical system influences the new policies of the management system, which together are the questions of quality systems. In each of the processes, program evaluation data gathering techniques (qualitative and quantitative) are designed to suit the purposes of each action, e.g. assessment of needs.

Conclusions

Quality evaluation in higher education is a site-specific issue, although there are some common standards and procedures. The culture of organizations, values, politics of states and institutions, educational applications, external stakeholders, educational philosophies adopted are the factors influencing evaluative approaches and practices. These aspects need to be improved by research and practice.

Quality assurance is not a concept which is classified as right or wrong. Each institution will establish its own quality assurance system according to its internal structure and dynamics using standards and concepts determined by the philosophy. However, it is emphasised that the establishment of assurance and evaluation standards will help to enrich the quality systems. In order to do that, the program evaluation should be considered as a systems approach, and the appropriate model should be integrated into quality planning.

Rationale

A newly developed theory of quality is presented above, especially in the area of educational needs evaluation, systems approach, and practice. In this regard, the quality systems theory-based evaluation model is the first in the area of higher education.

The model makes valuable contributions to the field of higher education program evaluation for three reasons:

(1) Higher education is composed of sub-systems in interaction, making the entire system open, continuously changing, and embedded into a super-system. The model is unique in this sense, in combining program evaluation and quality systems.

(2) So far, evaluation models are assessment-based, relying on the institutions meeting quality requirements through a set of standards generally structured to meet quality awards requirements like ISO 9000, Malcolm Baldrige and

Deming's theories. The standard-based assessment systems focus on structural changes, usually managerial, in the institution, and are inspected by a controlling body.

(3) These assessment approaches usually seem to ignore the need for an in-depth evaluation of program aspects, since the foci of assessment are performance of key process and product characteristics. By meeting the standardized requirements, the institution neither obtains detailed information about the program activities, nor is informed of the effectiveness of the program from the viewpoint of stakeholders. In this respect, the model proposed in this study allows an evaluative approach, which can be informative about the effectiveness of program implementations of quality systems through a descriptive analysis of activities and perspectives of stakeholders.

The model is the first in terms of a "systems approach to an evaluation model" in quality systems. Viewing quality systems as "systems approach", Edwards Deming (1986, p. 27) stated:

> The people work in a system. The job of the manager is to work on the system, to improve it continuously, with their help.

This expression is of key importance to this model, since it is focused on system assessment for continuous improvement, a basic requirement in program evaluation as well. Hence, the systems approach model combines quality concepts and principles with program evaluation and understanding.

In conclusion, it is possible to say that the model is powerful in two ways:

(1) it is a well-integrated model for program evaluation and understanding of the quality systems in higher education institutions from the perspective of systems approach; and

(2) it offers a multiple-sources approach to stakeholder-oriented measurement in terms of both variety of dimensions and sources.

Even though the integration of principles and concepts of the systems approach into quality and program evaluation are compatible within the tradition and practices of higher education, the proposed evaluation model results in increased complication in practice as the model itself is an intensified combination of three different approaches into one unitary approximation/representation. The set of assumptions and the integration of theories reflected in the model need to be supported with further discussion. In practice, partial adaptation of the systems, for example, the technical system, at one time, and partial use (for example one set of implementation from one subsystem at one time) of the model components would lessen the intensity of approach of the model. Integration of the components of the model into one unit such as only focusing on managerial issues (e.g. key management processes) in phases would be a good start. To be an implementation model, it should be appropriately linked to the institution's mission, its culture, its strengths and weaknesses, its opportunities and threats, as an open system. The key element in implementing the model is the contextual characteristics of the institution and the situation in which the educational and managerial processes are embedded. In order not to cause confusion and consternation, a need-oriented approach, such as improvement and progress in areas

highly dependent on the consumer needs and expectations will enhance the acceptability of the model. At this point, it can be suggested that the levels of implementation and expectations should be clarified first before any further progress has been done. This could be done, for example, by the description of the current state of the institution, and an assessment of the needs and expectations of its stakeholders.

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