

IMPORTANCE OF TOTAL QUALITY MANAGEMENT (TQM) OR CONTINUOUS IMPROVEMENT SYSTEM (CIS) IN AN EDUCATION SECTOR AND ITS IMPLEMENTATION FRAMEWORK TOWARDS SUSTAINABLE INTERNATIONAL DEVELOPMENT

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ABSTRACT

Sustainable international development (SID) is a kind of international development that meets the needs of the present without compromising the ability, efficiency and values of future generations to meet their own needs. The objectives of the study are (i) to conduct action-based and field research on Total Quality Management (TQM) or Continuous Improvement System (CIS) in order to present QM ideas on education, (ii) to identify quality compliance requirements (QCRs) for an educational sector adherence to established standards based on an educational research conducted on quality circles (QCs) duly launched in twelve educational institutions in south India and (iii) to promote sustainable policy recommendation so as to strengthen quality educational services. TQM processes are divided into four sequential categories such as plan, do, check, and act (PDCA cycle) for continuous process improvement. In the *planning* phase, educationalists define the problem to be addressed, collect relevant data, and ascertain the root cause of the academic problem; in the *doing* phase, educationalists develop and implement a comprehensive solution, and decide upon a measurement to gauge its effectiveness and efficiency; in the *checking* phase, educationalists confirm the result through before-and-after data comparison; in the *acting* phase, educationalists document their results, inform others about process changes, and make recommendations for the problem to be addressed in the next PDCA cycle. It is concluded that TQM as a management approach of an educational institution centered on quality, based on the participation of all its members and aiming at long term success through beneficiary satisfaction and benefits to all members of the institution and society. TQM in an educational sector is based on quality management from the beneficiary's point of view. This action-based and field research on TQM can promote sustainable policy recommendation to strengthen quality educational services in an educational sector. In the present article, importance of TQM and steps involved for implementation of framework in an education sector are discussed.

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KEYWORDS: Education, Management, Policy, Process, Quality, Strength, Sustainable International Development

INTRODUCTION

Higher level educational institutions (HLEs) need to implement the educational values and quality improvement for the truth and pursue knowledge (Iyer, 2011). There may be specific focus given on the educational innovations, vision, mission and goals, guiding principles, environmental assessment, quality policies and principles, total quality management, master plans for institutional growth, supply of value added trained human power, obtaining feedback from stakeholders and for continual improvement, innovations in management and information communication technologies (ICT).

About 88% economic growth is created by innovation (Iyer, 2013). To achieve this level, literacy rate should be high. It is to take considerable steps to achieve socio-economical development by tapping educational and entrepreneurial resources. To ensure socio-economical transformation main input resources are innovation in quantity and quality of education coupled entrepreneurship, sustainable development, educational research and total quality management methods. It is lagging in quality management

systems right from the schools to teacher education and higher educational institutions which is very important concern of the hour to increase the literacy level. This research paper discusses on importance of total quality management in an education sector and its implementation framework towards sustainable national development.

TQM processes are divided into four sequential categories such as plan, do, check, and act (PDCA cycle) for continuous process improvement. In the *planning* phase, educationalists define the problem to be addressed, collect relevant data, and ascertain the root cause of the academic problem; in the *doing* phase, educationalists develop and implement a comprehensive solution, and decide upon a measurement to gauge its effectiveness and efficiency; in the *checking* phase, educationalists confirm the result through before-and-after data comparison; in the *acting* phase, educationalists document their results, inform others about process changes, and make recommendations for the problem to be addressed in the next PDCA cycle.

The A.K economic model for certain output level of economic growth is the product of engineering or technical factor level (A) and the capital (K) (Iyer, 2013). Therefore,

the solution is the creation of new sustainable enterprises by innovation. As per the standard production function discussed in the paper, the development of new knowledge is a crucial factor for economic growth as certain educational innovation level is required in engineering or technical systems. The economic growth is hereby explained by three factors as given below:-

1. The natural increase in the accumulation of labour potential (Iyer, 2006),
2. Capital accumulation or money with which a business is being started and run, and
3. Technological momentum (also called as total factor productivity (TFP) or efficiency in industrial processes.

The increase of labour and the capital accumulation be account for 12 percent of the economic growth, but the knowledge emerged that is coming from outside economy is described as technological change that is approximately account for about 88 percent (Iyer, 2006). The fundamental entrepreneurial momentum keeps the capital development dynamic which comes from the new enterprise creation process, new goods or service requirement from customers, the new methods of production and processes, new transportation, and new markets and new forms of industrial organization.

Standard Production Function (SPF) is expressed as

$$Y = f(C, L)$$

where Y=Output, C=Capital, and L=Labour

As knowledge is an important factor for the economic growth, Standard Production Function (SPF) is modified as $Y = A(C, L) f(C, L)$

'A' represents New Knowledge on engineering or technical system ,

Y= Output ,

C= Capital

L= Labor

f = Standard production function

Hence the development of new knowledge is a crucial factor for the economic growth. As per the given standard production function, knowledge is a decisive production variation (Iyer, 2006).

Objectives of this Research

The objectives of the study are (i) to conduct action-based and field research on TQM in order to present QM ideas on education, (ii) to identify quality compliance requirements (QCRs) for an educational sector adherence to established standards based on an educational research conducted on quality circles (QCs) duly launched in twelve educational institutions in south India and (iii) to promote sustainable policy recommendation so as to strengthen quality educational services .

Associated Objectives

1. To identify and evaluate present educational problems in educational sector ;
2. To provide solution for the various problems encountered with special reference to :-

conduct of quality improvement (QI) programs for faculty in order to enrich pedagogy skills, professional and research training , the conduct of innovative add on courses (QIPs) and research courses, faculty competency profile and performance assessment and evaluation ,

Workload norms for faculty employed in Lower and Higher Learning Institutions, Comprehensive profile for the science, engineering and technological faculty.

to incorporate industrial oriented courses in curriculum to formulate and appraise innovative in-service and pre-service faculty development programs (FDPs) .

to improve the productivity of faculty and quality of lectures in educational institutions,

to promote feasible experiments in education sector .

3. To implement Total Quality Management (TQM) concepts in an educational sector,

4. To innovate sustainable educational innovations;

5. To promote the concept of sustainable entrepreneurship education in education sector;

To promote environmental education in an education sector as environmental science, solid and hazardous waste management, sustainable entrepreneurship and sustainable development are the basis of environmental education in this century.

MATERIALS AND METHODS

The author has conducted action-based and field research on TQM in order to present QM ideas on education and quality compliance requirements (QCRs) for an educational sector adherence to established ISO standards based on an educational research conducted on quality circles (QCs) duly launched in twelve educational institutions in south India .As per educational statistics study revealed that a person receives one-fourth of education from teacher, another fourth by own intellectual efforts, another fourth from fellow people and the rest during time through life experience (Iyer, 2014). An entrepreneur learns from life experience of education. The subtle relation between education and entrepreneurship are intricate processes that need to be present in our educational system to benefit more from the emerging enterprises spirit. Entrepreneurial process is set of entrepreneurial activities interacting and inter-relating each other. That is quality in terms of relevance and degree of academic excellence and quantity in terms of number of things access to these activities.

Total Quality Management (TQM) in an Education Sector

Total Quality Management (TQM) concepts consisting of institution -wide efforts to establish permanent a climate for continuously improving its ability, efficiency and values to deliver high-quality educational services to the beneficiaries (Iyer , 2006).

TQM requirements for an educational sector adherence to established standards such as International Organization for Standardization's ISO 9000 series as given in figure mentioning the process approach in an educational system. It defines that TQM as a management approach of an educational institution centered on quality, based on the participation of all its members and aiming at long term

success through customer satisfaction and benefits to all members of the institution and society. Hence, TQM is a process based on quality management from the beneficiaries' point of view as shown in figure 1

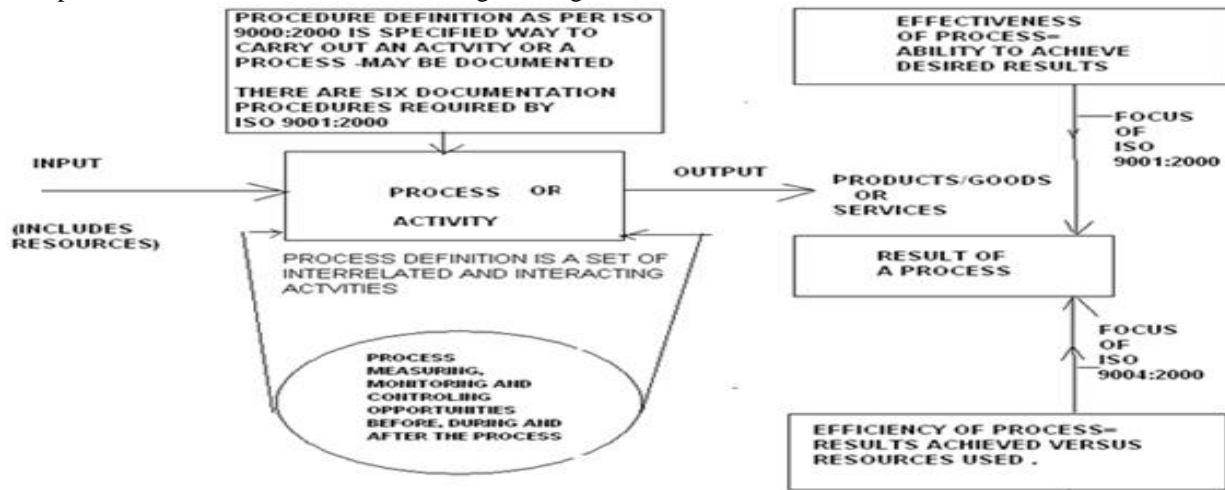


Figure 1. Schematic representation of a process

TQM processes are divided into four sequential categories: plan, do, check, and act. This is also called the PDCA cycle or Deming's cycle for continuous process improvement. In the *planning* phase, educationalists define the problem to be addressed, collect relevant data, and ascertain the problem's root cause; in the *doing* phase, educationalists develop and implement a solution, and decide upon a measurement to gauge its effectiveness and efficiency; in the *checking* phase, educationalists confirm the result through before-and-after data comparison; in the *acting* phase, educationalists document their results, inform others about process changes, and make recommendations for the problem to be addressed in the next PDCA cycle. ISO 9000 series focus on quality management and defines the features of a quality management system (QMS) that need to be in place to ensure that educational sectors identify and focus on improving the areas where they have significant educational deficiencies. TQM techniques and various process analysis tools include lean manufacturing and six sigma and international organization for standardization (ISO) standards such as ISO 9000, ISO 14000, ISO 18000 and ISO 50000 standards. Institutions should be able to implement TQM by following quality standards for their sustenance (Iyer, 2006).

Quality Circles in Educational Institutions

Quality circles (QCs) have been launched in Prince Dr. Vasudevan College of Engineering & Technology (Affiliated to Anna University) under the academic administrative control of Principal (Presently Professor at KLEF Deemed To Be University). QCs facilitate educational sectors to identify and solve the academic and research related problems. There is scope for the group-based solution of academic related problems.

QC employs the following quality improvement (QI) tools:

1. Cause-and-Effect diagrams (Fishbone diagrams)

2. Pareto Charts
3. Data Collection through Check Sheets (Process Maps, Data gathering tools), Stratification of data.
4. Graphical tools such as Histograms, Frequency diagrams and Pie charts
5. Statistical Quality Control (SQC) and Statistical Process Control Charts (SPC) Charts
6. Scatter Diagrams and Plots and Correlation Analysis
7. Flow Charts

QCs have been adopted to prepare 'Total Quality People (TQP)' so as to promote SPC and SQC in academics and research for improvement of students' academic performance and students' personality development, teaching and learning process which include steps to improve results.

The class committee serves as a 'QC' for the class. The course committee serves as QC for the course. University and college class committee consists of the concerned teacher, student representatives and a chairperson who is not teaching the classes be formed for each class. QCs meet on a regular basis normally at two-week intervals of time for one or two hours duration. Four or five meetings per semester have been conducted. The functions of the class committees are to identify problem faced by the students which must be taken up on priority. Problems are clarified and analyzed by basic problem-solving methods. Solutions for the problems are identified and evaluated. This causes and generates number of viable alternative solutions.

Hence, the class committees function towards addressing students' problem and solution, including assignment of weightage for various course modules of evaluation,

identification of weak students and improving their performance, failure mode effect analysis (FMEA) and recommending necessary corrective action and preventive action by the teachers

The students' absenteeism is the most widespread problem existing in the institution for a long time. By discussion in the QC and class room using brainstorming and other tools, various causes and the recommended remedies be evaluated. Late coming is a problem in educational institution. An attempt has been made to solve students' late coming problem to study the causes and remedies. Steps to improve academic and research performance have been evaluated.

Education Coupled With Entrepreneurship Is an Intricate Process

Iyer, Vijayan Gurumurthy has discussed an integrative approach in the paper entitled "Education Coupled with Entrepreneurial Process Approach Towards Sustainable Development" which has been included in Abstracts & Proceedings Book of the Global Conference on Contemporary Issues in Education (ISSN: 18770428) organized by the Academic World Education and Research Center, www.awer-center.org, at Las Vegas, USA during 12-14, July 2014 duly published by Elsevier B.V. Ltd., <http://www.globalcenter.info/globe-edu/wp-content/uploads/2013/06/GLOBE-EDU-2014-Abstracts-Book.pdf>, pp.17 , 32-33. Sustainable entrepreneurship is an integrative approach based on entrepreneurship and innovation management. It focuses in depth understanding aspects as idea generation, science, engineering and technology based entrepreneurship, marketing and markets, organization and project management, new product and process development, entrepreneurial finance, human resource development and operations (Iyer, 2009). This is called special education which will be encouraged to combine and apply students' creativity and skills to develop a science, engineering or technology-based idea. The objective in education sector is to introduce the concept, issue, and theme related to business planning, strategy, and entrepreneurship as well as the functional activities in a business venture such as guidelines to set up an entrepreneur and become a successful entrepreneur. It is necessary to explore the business planning and strategic management issues of engineering or technology driven enterprises in the early stages of development. Business analysis and planning skills are developed in this course.

The beneficiaries will be encouraged to assess and evaluate their potential for entrepreneurial careers and develop attitudes and skills that will be useful in engineering or technological new ventures.

1. Learn and understand market identification and assessment techniques
2. Guidance on how to develop new business idea and successful business plan preparation.
3. Fundamental of finance and marketing
4. Intellectual property protection
5. Soliciting funds
6. Successful business partnership
7. Preparation of Detailed Project Reports (DPRs)

8. Project implementation schedule.

"Sustainable entrepreneurship" is a kind of entrepreneurship that meets the needs the present without compromising the effectiveness, efficiency and values of future generations to meet their own needs (Iyer, 2007). A person who sets up and runs successfully a small, medium or large-scale enterprise or business at considerable risk is an entrepreneur. The entrepreneur combines efficiently six kinds of input resources, viz., capital, man power, market, machineries, raw materials and method to manufacture output goods, products or provide services. An entrepreneur is thus who organizes, manages, assumes risks and enjoys profits of enterprise or business successfully. A sustainable entrepreneur propels entrepreneurial growth through innovation. Environmental entrepreneur considers the environment in planning and decision making and to arrive at actions which are more environmentally compatible. The concept of sustainability is highlighted when one works in a manner that resources do not get depleted due to business endeavors. Hence, implementation of this concept enables final year undergraduate course students to become successful new entrepreneurs (Iyer, 2009).

Educational Resource Planning (ERP)- A Software Tool for Computer Based Education

Enterprise Resource Planning (ERP) is software that helps to integrate nearly all the functions of an educational institution enabling to plan, track and see its resources in the best possible way to receive its customers (Iyer, 2012). The resources are (1) faculty and staff that is man power, (2) Infra structure facilities that is machine power, (3) educational methods, (4) educational materials, (5) capital budgeting and financial resources and (6) market to meet supply and demand of value added human power .

ERP efficiently integrates the islands of education information within the educational institution.

The following methods and educational materials including self-learning entrepreneurial materials (SLEM) have been used. There is considerable educational growth in terms of quantity in Schools, Universities and Colleges. There is also growth of infrastructures. As per an educational survey, only, about 75% of the faculty members possess bachelor's degree in their respective disciplines. More than 80% of them do not have sufficient experience in teaching and research. Hence it is required for them to improve their standard of education to master's and doctorate degree as well research level (Iyer, 2009).

To develop faculty various innovative methods such as quality improvements (QI) programs, flexible QI programmes, in-house QI programmes, distance-cum-contact courses, sequential summer and winter schools, and part-time programs must conduct in teacher educator institutions. Faculty must be provided with sufficient career opportunities to improve upon their qualifications through the quality improvement (QI) programs to get them imparted pedagogy and professional training requirement including research expertise. Under the quality improvement programs (QIP), a

variety of short term courses need to be imparted to meet the training needs for all levels of faculty.

The improved educational sector should incorporate three methods, viz., [1] Total Quality Management, [2] Peer Review and Evaluation, and [3] International and National Accreditation and Assessment by a competent educationalist or organization.

This research provides some efficient methods and educational innovations to improve the productivity of faculty and quality of lectures at par with the international academic standard in an educational sector. The quantity and quality management system standards including internal academic audits may be practiced in schools, teacher education and higher educational institutions. TQM elements are given below:

1. Requirements of trained human power
2. Quality circles in educational institutions
3. To specify faculty workload norms and workload distribution per week;
4. Preparation of lecture plans (yearly/semester wise, weekly & daily), lesson action plans for Theory, and practice;
5. Self-assessment Report by the faculty for each day's progress (work diary) Table. Reporting weekly summary report by the teacher given in Table
6. Requirements for the structure of the classroom lecture and quality of lectures.

7. Methods for preparation of the lecture notes and methods for preparation of lecture notes supplement.
8. Computer oriented e.based education.
9. Setting up of performance appraisal system for the faculty
10. Training and development of teacher-educator
11. ACADIS (Academic Information System), teaching slots and faculty credit log concepts.
12. Sustainable entrepreneurial education.
13. importance of environmental education in an education sector as Environmental Science and the Sustainable Development are the basis of environmental education of this century for the quality of life .

Values Driven Quality Management (VDQM) System Approach

Culture must be realized for quality and productivity within an educational sector. Quality management (QM) is defined as a set of systematic activities carried out by the entire institution to effectively and efficiently achieve institutional objectives to provide educational services with a level of quality that satisfies customers at the appropriate time and cost. QM is the culture of an institution committed to customer satisfaction through continuous improvement. By supplementing the QM with the culture which continuously incorporate educational values into the management of quality in an educational sector . That is by superimposing the culture cycle on the QM cycle shall create the values driven QM (VDQM) cycle as shown in figure 2.

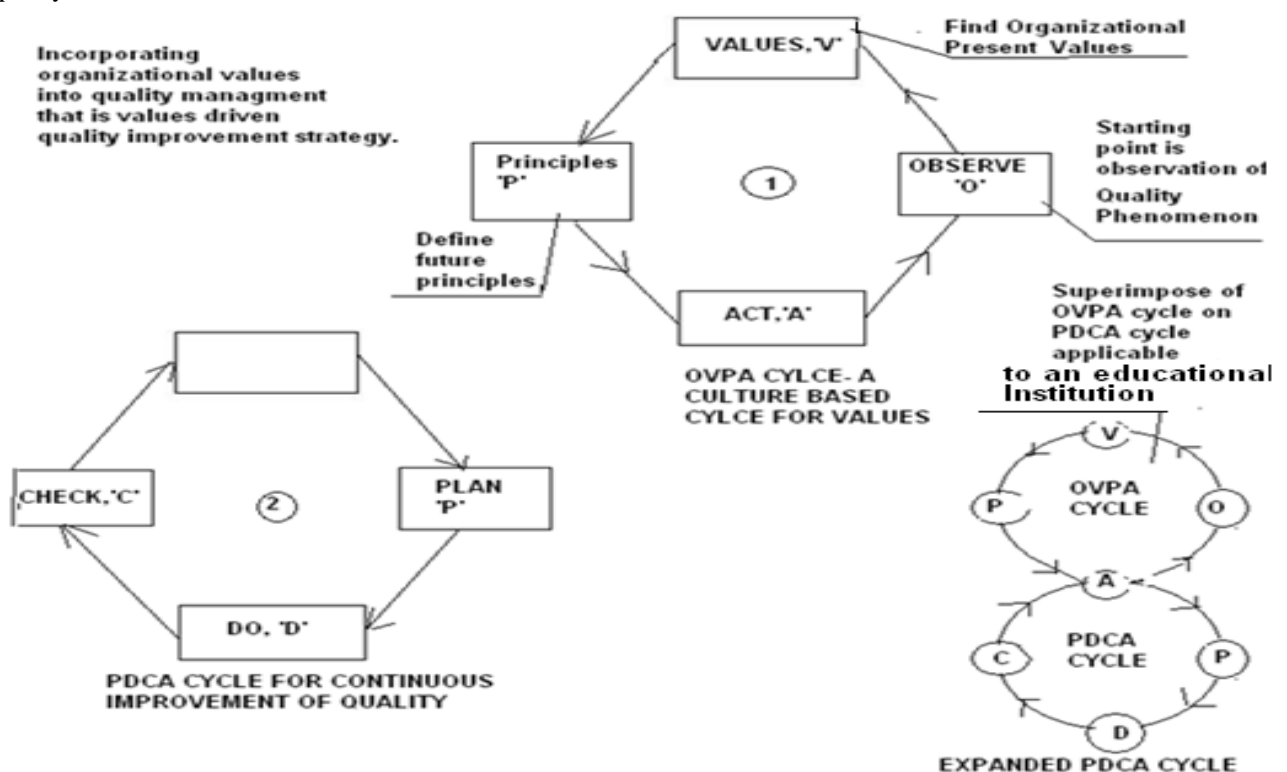


Figure 2 . Contains culture based total quality management (OVPA) cycle by incorporating the expanded PDCA cycle for an educational sector

VDQM system is a culture based comprehensive and structured approach to an educational management that seeks to improve the values and quality of educational services through ongoing refinements and incorporating educational

values in response to continuous feedback. By implementing VDQM in an educational sector shall succeed sustainable development. Sustainable development can be defined as a

kind of development that meets the needs of the present without compromising the ability, efficiency and values of future generations to meet their own needs. VDQM is defined as values driven quality management system approach of an educational institution centered on quality and values based on the participation of all its members and aiming at long term success through customer satisfaction and benefits to all members of the institution and society. The approach is based on values driven quality management from the stakeholder's point of view. VDQM processes are divided into eight sequential categories: plan, do, check, act observe, values, principles, and act. VDQM will be based on the integration of PDCA (plan, do, check, act, observe) cycle and OVPA (observe, values, principles, and act) cycle.

This combined cycle is also called the expanded *Deming's* cycle for deriving culture oriented continuous process improvement. In the *planning* phase, educationalists define the problem to be addressed, collect relevant data, and ascertain the problem's root cause; in the *doing* phase, educationalists develop and implement a solution, and decide upon a measurement to gauge its values, effectiveness and efficiency; in the *checking* phase, educationalists confirm the result through before-and-after data comparison; in the *acting* phase, educationalists document their results, inform others about process changes, and make recommendations for the problem to be addressed in the next OVPA cycle or *culture's* cycle for incorporating values.

Culture processes are divided into four sequential categories: observe, values, principles, and act. In the *observation* phase, educationalists observe present quality related phenomena of educational services; in the *values* phase, educationalists find present values of the educational services; in the *principles* phase, educationalists define future principles and in the *acting* phase, educationalists document their overall results, inform others about process changes, and make recommendations for the problem to be addressed in the PDCA cycle. ISO 9000 series focus on quality management for all sorts of manufacturing and service organizations. The features of quality management system (QMS) standards are needed to be in place in order to ensure our educational sector identifies and focuses on improving the areas where they have significant educational deficiencies. In the present article, importance of VDQM in an educational sector has been discussed. VDQMS standards and their compliance requirement (CR) with respect to higher and lower learning institutions (HLIs and LLIs) have been discussed appropriately such as International Organization for Standardization's ISO 9000 series, ISO 14000 series, ISO 50000 series, ISO 18000 series etc./ By continuously working with culture based quality policies our educational institutions automatically becomes part of the quality management (QM) process.

RESULTS AND DISCUSSIONS

Given below results and discussions provided which were based on the conduction of action-based and field research on TQM conducted in twelve educational institutions in south India.

Requirements of Trained Human Power

There is a need of the hour for educational institutions to identify and demand for supply value added knowledgeable trained human power since the job opportunities have been undergoing considerable change. The job opportunities in Government and autonomous organizations as well public and private sector companies have been declined as compared to traditional job requirement which was called product approach. The industrial or manufacturing process manpower requirements have undergone considerable change (Iyer, 2009). The manpower requirements have been downsized and outsourced. An innovative human resource (HR) process management approach shall apply for all science, commerce, engineering, technological and management disciplines. The human work force in core and allied support industries have been declined. This requires human work force that can innovate sustainable green product designs, product green manufacturing, product marketing and organizing industries. They have to innovate and their job requirements change in order to meet the global competence. This need supply of knowledgeable trained human power which can be only possible from the educational sector.

The entrepreneurs and employers are looking for the trained students in all basic fields with sound knowledge base in their core discipline and with abilities to adapt for new sustainable demands as well as in the service sector. It is projected that within fifteen years' period about sixty to seventy percentage entrepreneurial and job shall be available in-service sector. The requirement is not only persons who are experts and innovators at high end but also for highly skilled persons who can work at second or third level. Hence man-power requirement has been increasing in science, engineering, technological disciplines, as well as social, humanity, economics and commerce and service industries. There is a shortage of human power in these fields and to bridge the gap between demand and supply, it is a must for the educational sector to supply the trained human power (Iyer, 2006).

Academic Performance Indicator and Requirements for Faculty Competency Profile

Considering the role to be played by the faculty, a competency profile consisting of ten areas have been developed. By self-evaluation, one can rate the present level of competency (Iyer, 2013). Then one can plan for acquiring additional competencies through various faculty development programs (FDPs). The following are the major areas of competency profile of a faculty member in a college or University, which can be rated for self-evaluation and appraisal:

Result of Academic Performance Appraisal System

A performance appraisal system for teachers should be sent up well integrated with institutional functioning and this should lead to the identification of individual training and development needs (Iyer, 2014). This should also enable the identification of teachers whose performance is outstanding. Such performances and excellence should be well recognized and rewarded. All teacher educational institutions should

introduce a system for performance appraisal. The performance report should comprise the data such as publication of refereed research papers of faculty, paper reading in seminars / refereed conference, publication of books, citation indexed database(CID), research contributions, biographical reference books, patents, innovations, inventions and refereed discoveries. This system should be followed by the management for career advancement of faculty.

Workload Norms of Faculty

Workload norms for faculty have been prepared. These are outcome of intensive discussions held during various

seminars. Given below the workload norms for a faculty in an University to attend his or her normal duties:

1. Teaching Workload 16 hours / week
2. Preparation Time 16 hours / week
3. Research work 10 hours / week
4. Organizing Science, History, Mathematical Tutorials/ Science outdoor/ indoor activities/ Exhibitions hours/week
5. Co-ordination of extra- curricular activities 6 hours/ week

Given below the workload norms for the various levels of faculty in educational institutions: -

Table 2 Work load norms for the various levels of faculty

Duties	Lecturer	Assistant/Associate Professor	Professors/Dean Principal
Teaching workload conduct hours	20 hr/ week	18 hr/ week	10 hr/ week
Preparation Time	12 hr/ week	10 hr/ week	8 hr/ week
Research work	10 hr/ week	15 hr/ week	19 hr/ week
Teaching Administration	Nil	6 hr/ week	6 hr/ week
Organizing Tutorials/ Seminars/ Exhibitions	20 hr/ year	40 hr/ year	40 hr/ year
Co-ordination of extra- curricular activities	6 hr/ week	5 hr/ week	1 hr/ week
Teaching work load / Total credits	13 hr/ week	10 hr/ week	9 hr/ week

Given below the norms for faculty in higher educational institutions to attend his/her normal duties as per the following schedules as per Table-3.

Table 3 Faculty – Workload distribution per week

Sl. No.	Programme Activity	Principal Professor HOD (Hours)	Assistant Professor (Hours)	Jr. Teacher (Hours)	MIMIC
1	Total Contact Hours (Instructions) (TCH)	8-0-0	LTP 8-0-8	LTP8-0-16	LTP
2	Preparation Assessment and Evaluation	8	12	16	PAE
3	Research and Project Guidance	6	10	14	RPG
4	Academic administration	14	8	4	AA
5	Counseling	2	2	0	AA
6	Developmental Activities	2	2	1	C
7	Exhibitions/Industrial Visits	3	2	1	DA
8	Seminars /Workshops/symposia	1	1	1	IV
9	Extracurricular activities	2	1	1	SW
10	Consultancy	1	1	1	ECA
		1	1	1	CON

Footnote:

- o Wherever the Senior Faculty is not available in sufficient number, the department shall utilize Junior Faculty for Academic Administration.
- o Semester Workload is 12 weeks.
- o Norms for correcting the test papers and assignments
 - Time allocated per paper = 15 min
 - Time required for correcting 60 papers (one class) = 15 hrs.
 - Total time required for 4 tests and assignments in a semester = 60 hrs

1. Faculty should maintain the workload diary. In the work daily diary, the teacher should write the

Procedures for Presentation of Self-Assessment Report by a Faculty

details of the lectures engaged during the day,
number of students present and topics covered.

Table-4 Self-assessment by the faculty for each day's progress

Work load diary						
Date	Time	Class	Subject	Student present	Topic covered	Remarks

- If the lecture is not engaged, remark should be entered why the lecture was not taken and what arrangements is made for extra lecture as well as compensation.
- Based on the daily work diary, details for a week that is weekly summary report should be prepared as per the following format given.

Advantages of daily Plan

- The daily plan gives an idea what has to be done at a particular instant of time during a day whether a particular point has to be discussed in brief or in detail.
- This avoids wastage of time.
- This helps to complete the topic as per the time schedule
- This manages efficiently to complete the lecture.

Table 5 Preparation of Weekly Summary Report

Class :Subject: Date : From ----- : To----
Number of lectures allocated
Number of lectures engaged
Number of lectures not engaged
Number of extra lectures engaged
Number of extra lectures to be engaged
Remarks

Procedures for lecture notes & lecture notes supplement preparation

- Preparing the Lecture Notes
 - The lecture notes should be prepared on loose sheets with the papers relating to one lecture filed together. The papers should be numbered
 - On the right hand corner, a margin of 5cm is kept for putting remarks. The remark column should be used for entering the names of references from which the materials has been collected.
 - The lecture notes should be made up to date and self-informative.
- Preparing Lecture Notes Supplement
 - Each lecture notes should be prepared with a Supplement.
 - It should contain the details about the topic namely additional books, journals, publications and other relevant references for further reading.
 - It should contain the list of expected questions so as to enable the student to get prepared for answering all questions.
 - It should contain the list of instructional aids namely Overhead Projector, Charts and Models, Slide Projector and Photo Displays Board.
 - It should contain the summary of complete lecture as well as the topic covered.
 - It should contain the topics of next lecture.

Tips for Preparing the Lecture Plans

- The syllabus should be divided into the main topics and sub topics. Time required for the main topic, and each sub topic should be noted.
- Curriculum of the various classes to be taught should be prepared. This is because same topic may be important for one class which may not be required for the other class.
- The information should be up-dated for providing to the students. The new plans should be formulated. This should be prepared based with the current plans and additional material from new books, journals, publications and seminar proceedings.

Tips for preparing the weekly plans are similar to the yearly plans

- Tutorial timings are not fixed in advance at the beginning of the academic year and semester. Weekly schedule for the tutorials for that particular week is to be prepared as and when the information for the tutorials is made available.

Table- 6; Format for Lesson Plan-Theory subjects/Tutorial / Laboratory/ Practical

- Name of the College/University with Address:
- Department : Name of the faculty:
- Subject & code :
- Semester : Class / Batch :

Unit Number	Sub-Topics	Text/ Reference Books Chapter & Page Numbers	Week Number	Date	Number of Period Allotted	Cumulative Periods
(1)	(2)	(3)	(4)	(5)	(6)	(7)

Place

Dated: Signature of the faculty with name

Structure of the class room lectures

Time duration of the elements of a class room lecture and brief description is given below:

- 1. Introduction - 5 min
- 2. Actual Lecture - 40 min
- 3. Summarizing - 5 min
- 4. Students Queries - 5 min
- 5. Attendance - 5 min

1. Introduction;

- 1. At the start of class lecture, introduction should be made in brief and interesting
- 2. The introduction should give an idea about the learning in the lecture.

2. Actual Lecture;

- 1. During the lecture, simple questions should be asked to the students and link their answers to the topics to be taught.
- 2. All students must be involved with the lecture and understand it better.
- 3. The phase and content of the lecture should be planned and decided such that an average student is able to grasp the contents of the lectures.
- 4. Direct dictation should not be given form his notes.
- 5. All the points of the lectures should be explained while looking in the eyes of the students.

3. Summarizing;

- 1. Summarization should be good as it again highlights the points covered in the lecture.
- 2. References should be given for additional details on the topic of the lecture.

4. Student Queries;

Student queries should be attended. The doubts should be cleared.

By adapting proper instructional strategy, the students are encouraged to work mentally and to increase their cognitive skills. Their attitude towards the industrial jobs increases positively. This enables them to do their interviews well. They will be also to orient themselves to suit the job requirements easily and quickly.

Software on Educational Resources Planning (ERP)

Why is ERP Required?

- (1) Speed of the teaching-learning process
- (2) Monitoring, measurement and control opportunities in educational environment
- (3) Innovation in education and entrepreneurship.

Approach to ERP Implementation - A Road Map

Road Map for successful implementation of ERP

- 1. Clear Management Commitments
- 2. Top class ERP leadership
- 3. ERP only after process improvement

- 4. Training to implementation task force and user group
- 5. Right choice of ERP packages

Four options for developing ERP Packages

- 1. Developing an own ERP package (in-house development)
- 2. Modifying and enhancing the capabilities of the existing system
- 3. Buying readymade package
- 4. Engaging a software company

Correct Approach to ERP Software

The options are dependent upon strategic planning and decision-making process and need a substantial capital investment. Right option has to be selected only after evaluating the cost-benefit analysis (Iyer, 2014).

Results of Quality Circles in Educational Institutions

Quality circles (QCs) have been launched in Prince Dr. Vasudevan College of Engineering & Technology (Affiliated to Anna University) under the academic administrative control of Principal (Presently Professor at Haramaya University). QCs facilitate educational sectors to identify and solve the academic and research related problems. There is scope for the group based solution of academic related problems.

QC employs the following quality improvement (QI) tools:

- 1. Cause –and –Effect diagrams (Fishbone diagrams)
- 2. Pareto Charts
- 3. Data Collection through Check Sheets (Process Maps, Data gathering tools), Stratification of data.
- 4. Graphical tools such as Histograms , Frequency diagrams and Pie charts
- 5. Statistical Quality Control(SQC) and Statistical Process Control Charts (SPC)Charts
- 6. Scatter Diagrams and Plots and Correlation Analysis
- 7. Flow Charts

QCs have been adopted to prepare ‘Total Quality People(TQP)’so as to promote SPC and SQC in academics and research for improvement of students’ academic performance and students’ personality development , teaching and learning process which include steps to improve results .

Results of Computer Based Education

There are timetabling, scheduling software have been designed to use the available teaching resources effectively. Each faculty must maintain a course page descriptive and notify web URL address to the students. Lesson plans for theory, tutorial and practice shall be prepared and uploaded in website including lesson plans, lecture notes, supplements. These locations or pages can also display students’

attendance, test marks, and assignments. There shall be a class group or course group for each subject and these e-group members having mail ID communicated through e-mail compulsory.

Given below concept of Academic Information System (ACADIS), Teaching Slot Concept (TSC) and Faculty Credit Log Concept (FCLC) to efficiently manage academic courses conducted for the various classes at all levels (Iyer, 2009).

ACADIS, Teaching Slot and Faculty Credit Log Concept

Step-1 : Preparation of academic information system ; - Details of Academic courses are prepared which is called Academic Information system (ACADIS) during trimester / semester.

1. One lecture hour per week is rated as one credit hour.
2. Two tutorials or two practical hours per week are rated as one credit.

Example: - How to prepare the ACADIS

Step II: Preparation of teaching slots: -

This is the one page information which shows the teaching slots of the faculty and free time slots (FTS).

1. The teaching workload is calculated as in terms of credit-based contact hours.
2. One lecture hour per week is rated as one credit hour.

Table-1; Teaching slots of department even semester (2013-2014)

S. No	Teaching Slots	S. No	Teaching Slots
1	ECE4A-EC402-T1-3.5-ECE-SLT	35	ECE6-6E1-D2T1-2.25-ECE-ASL
2	ECE4A-EC403-T1-3.5-ECE-DKS	36	ECE6-6E1-D2T2-1.5-ECE-AKT

Step- III : Faculty credits log concept:

The teacher individual Teaching Workload and Projects Workload are given in credits.

Environmental science and Sustainable Development are the Basis of Environmental Education

Environmental education is a new multidisciplinary aspect with implemented ecological philosophy and ecological ethics, establishing New Civilization Sustainable Development through a new subject Environmental Science (Iyer, 2006). This signifies a new education. New civilization requires new approaches to education that will be educated in “Modern Research Universities and Colleges and Schools which have a unique and important role. This means information, knowledge and understanding of the following significant fields: a) in the concept of sustainable development- knowledge of the basic principles: precaution, risk prediction, prevention of causes, new assessment of the environment, changed behavior, changed methods of consumption and the establishment of the necessary demographic institutions and processes, b) in ecology, main principles , laws, definitions and terminology, c) basic factors of the environment , air , water, soil , solid waste , bio-diversity, the circles of matter, d) sources and methods of risk introduction to the environment e) Impact of old

3. Two tutorial or two practical hours per week are rated as one credit.
4. The conduct hour is sum of theory tutorial and practical hours.
5. The conduct hour is interpreted as “One hour of practical / tutorial classes is treated as one hour of lecture”.
6. The departmental codes are identified in three letters.
7. The number of teaching slots is prepared as one line statement.

For example a teaching slot statement mentioned below is interpreted as

ECE4A- EC402-T1-3.5-ECE-SLT

ECE4A is the Branch code / semester / Sub-section
EC402 is the Subject code entitled

“Transmission lines and Wave guides”

T1 is the main teacher / T2 is second assisting teacher / T3 is Third assisting teacher.

D1T1 is Day 1 main teacher / D1T3 is Day I third assisting teacher.

3.5 is the credit hours of the individual teacher

ECE is the handling department

SLT is the mnemonic of handling teacher.

Example: - How to prepare the Teaching Slots

technologies and fundamental knowledge in the new technologies and other solutions in different fields outside the profession. New education is necessary which will be carried out from two aspects, (i) interwoven through all

professional subjects and (ii) synthetic multidisciplinary by the integrating subject-Environmental Science and Sustainable Development (Iyer, 2013). Based on experience in transferring the knowledge in the field of (i) Environmental Science and (ii) Sustainable Development to the students at several faculties, that the last two semesters of University education in all disciplines of science, engineering and technology should include the course “Environmental Science” and “Sustainable Development “. The last year of studies is most suitable because till that time the student has acquired knowledge in different domains of his profession, so with the study of Environmental science and sustainable development, the student synthesize knowledge. The course should cover approximately two lessons per week and two lessons for the discussion on the preparation of the essay and individual seminar paper(GailM.Gallitant, 2009).

SUMMARY

Total quality management (TQM) is defined as a set of systematic activities carried by an entire institution to

effectively and efficiently achieve institutional objectives that satisfies beneficiaries at the appropriate time and price. TQM is a comprehensive and structured approach to an educational management that seeks to improve the quality of services through ongoing refinements in response to continuous feedback. Educational quality is defined as the totality of features and characteristics of educational services that bear on its ability and efficiency to satisfy a given or implied need. TQM of an educational sector can achieve academic and research excellence and thus lead to SIND. International Organization for Standardization (ISO)'s 9000 standards focus on quality management (TQM) of all sorts of organizations. It defines the features on quality management system (QMS) that need to be in place to ensure that institutions identify and focus on improving areas where they have significant deficiencies.

Education coupled with entrepreneurial process is an intricate SIND process which is a targeted area of research to eradicate poverty from the emerging enterprise spirit. Output of the process is an international and national educational service to the beneficiaries and thus there must be concerned to both educational quantity and quality management. It must adopt an open, transparent and efficient method to cope up the present demand and supply of value added knowledgeable trained human power. It must depend up on the strong updated curriculum and syllabus, efficient teaching-learning process, performance evaluation, productivity of faculty, staff and students, lectures quality, research and development, consultancy and extension, students' support and progression, educational innovations, enhancement strategies, plans for institutional growth, feedback from stake holders, innovations in an institutional development, management information system and information communication technology.

CONCLUSIONS AND RECOMMENDATIONS

As per educational statistics study revealed that a person receives one-fourth of education from teacher, another fourth by own intellectual efforts, another fourth from fellow people and the rest during time through life experience. An entrepreneur learns from life experience of education. The subtle relation between education and entrepreneurship are intricate processes that need to be present in our educational system to benefit more from the emerging enterprises spirit. Entrepreneurial process is set of entrepreneurial activities interacting and inter-relating each other. That is quality in terms of relevance and degree of academic excellence and quantity in terms of number of things access to these activities. Hence, education coupled with entrepreneurship is an intricate sustainable educational process that is needed to eradicate poverty from the emerging enterprise spirit point of view.

It is a national and international service concerns both quantity and quality management systems. That is quantity in terms of access to engineering education and quality in terms of relevance and degree of academic excellence. There is a challenge for nationalization and internationalization by the educational institutions with relevant to the current and projected needs of our society and industries. Their academic

potential, credibility and excellence must grow with respect to time. The ideas and ideals of the institutions may evolve and change with respect to global trend, international as well national requirements. Our current education must adopt open, transparent and efficient system to produce and supply value added knowledgeable trained human power. As discussed in this paper, both quantity and quality shall depend up on strong updated curriculum and syllabi, efficient teaching-learning process, performance evaluation, productivity of faculty, staff and students, research and development, consultancy and extension, students' support and progression, educational innovations, enhancement strategies, plans for institutional growth, feedback from stake holders, innovations in institutional development, management information system (MIS), and information communication technology (ICT). Quality education represents efficient teaching-learning process approach, customer focus, staff learning, and continuous improvement, quality transformation of knowledge, awareness creation, attitudes and skill development.

As discussed in this research paper supported with result that the Total Quality Management (TQM) concepts in educational sector need to be implemented for the highest degree of excellence in education. It is need of the hour to promote environmental education in education sector as Environmental science and sustainable development are the basis of sustainable education in this 21st Century.

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