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Quality Circles: An Overview

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In this paper, a modest attempt has been made to understand one type of small group activity, viz., Quality Circle (QC). Although the basic idea of QC originated in the USA, the right combination of factors existed in Japan and much of the success of the Japanese industries today can be ascribed to the QC concept. The paper has tried to cover the available documented literature on the concept of QC as well as the various definitions of QC. The basic philosophy of QC and its unique features and the objectives of QC have been dealt with to have a proper understanding of this concept.

Introduction

The gathering together of people from the same work place to participate in some activity with a common goal is called small group activity (SGA). The Quality Control Circle (QCC) also known as Quality Circle (QC) is one type of group activity seen frequently. Self-managing teams and zero-defect circles are other examples. Ishikawa believed that all divisions and all employees in the organisation should be involved in studying and promoting quality control by learning seven statistical tools. He has created one of these tools, the cause-and-effect diagram. His second concept is that of the customer as primary in defining quality. His third concept is the QCC. He has well understood the value of using teamwork in solving quality-related problems.

Review of literature

The introduction of QCs in Japan in the post-war years had its roots in the highly motivating lectures delivered in Japan by Deming in 1950, a statistician working for the USA government [http://deming.eng.clemson.edu/pub/den/deming_1950.htm]. Deming's ideas were based on the experience of the US firms, operating yardsticks being the wartime industrial standards. Noting that the American managers had typically given the line managers (and the engineers) and the line workers about 85% and 15% respectively of their responsibility for quality control, Deming has argued that these shares need to be reversed. He has suggested that production processes should be redesigned with a view to effectively operationalising quality control mechanism and continuously educating all employees in an organisation from top to bottom in quality control and statistical control techniques. QCs are the means by which this continuous education is to take place for production workers.

Fiegenbaum (1986), a noted quality management expert, has defined the phase, Total Quality Management (TQM), as an integration of quality development, quality maintenance and quality improvement efforts that should be carried out on a continuous basis by any organisation.

As time progressed, other quality management experts continued to adapt to the original theories of Fiegenbaum and Deming, each emphasising a different aspect of quality journey. These experts include **Juran & Gryna (1980), Taguchi & Clausing (1990), and Crosby (1996).**

Juran (1992), a famous quality management consultant, has preached that quality begins at the stage of designing and ends after satisfactory services are provided to the customer. According to him, it is not the standard of quality during manufacturing alone that one should be concerned with but the Total Quality which is very important and is primarily responsible for the success of any organisation.

Weiss and Gershon (1989), experts in the field of production and operations, have called QCs as the best means today for meeting the goal of designing quality into a product.

Gregerman (1984), an authority on productivity improvement, has outlined a number of requirements for an organisation contemplating the use of QCs. The managers should be comfortable with a participative management approach. It is also important that the organisations have good, co-operative employee relations as well as the support of the middle-level managers for a QC programme.

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Many organisations find that QCs further teamwork and reduce employee resistance to change. Also QCs can improve an organisation's overall competitiveness by reducing costs, improving quality, and promoting innovation. **[Deming (1986); Juran (1980); Ishikawa (1972)]**

Crosby (1986), a noted quality expert, has stressed that quality improvement is built on getting everyone to do it right the first time (DIRFT). Management really has three basic tasks to perform: (i) establishing the requirements that employees are to meet, (ii) supplying the employees with the resources needed to fulfill the requirements, and (iii) encouraging the employees and helping them meet those requirements.

QCs in some community colleges abroad have been used to solve problems in their administrative departments **[Ladwig (1983); Moretz (1983)]** and in their student-support service systems **Ladwig (1983).**

Hirshfield (1983) have noted that QCs imbue students with a greater sense of purpose in the classroom and provide them with an enhanced sense of self-worth.

A look at the definitions of QC

According to **JUSE (1970)**, QCs are small groups from the same workplace that operate autonomously and carry out quality control activities. The members of these small groups learn on their own and teach one another as part of a company-wide-quality-control movement. The Circles use QC methods to involve the entire work force in continuously improving the management of the workplace.

In their major work, Japanese Quality Circles and Productivity, **Ross** and **Ross(1982)** has defined a QC as a small group of employees doing similar or related work who meet regularly to identify, analyse, and solve product-quality and production problems and to improve general operations. The QC is a relatively autonomous unit (ideally, comprising about ten employees), usually led by a supervisor or a senior employee and organised as a work unit.

According to **Nigam (2005)** there are four phases of quality and Total Quality Management (TQM) is considered as the final phase. The four phases are:

a. Quality Control

Quality Control is a system of means for economical production of commodities or services of the quality that meets the buyers' demands. Also, since control employs statistical approaches, it is sometimes specifically referred to as Statistical Quality Control (SQC). In Quality Control, the product is checked for dimensions. If it lies within the control limits it is accepted. Hence, the target is just to keeping the dimension within acceptance levels and the product passes through sampling. In this, there are bound to be rejections as quality check is only the final stage without taking into consideration the process.

b. Quality Assurance

In this producer guarantees the product. In case of mass production the customer specification is translated into engineering specification by the R&D people. Then, with proper process control (PPC), the quality is assured to the customer.

c. Company-Wide-Quality-Control (CWQC)

To effectively execute Quality Control , participation by and co-operation of all members of the organisation, covering market research, research and development, production planning, designing, production preparations, purchasing and subcontracting, manufacturing, inspection, sales and after-sales service as well as finance, personnel and education is needed. Quality Control thus executed is called CWQC.

d. Total Quality Management

TQM is a phase in which internal forces of an organisation drive towards quality. It is not dictated by any particular issue but there is a change in culture. There is participation, commitment and a feeling of pride in each individual of an organisation.

QCs are an integral part of TQM.

QCs take up the behavioural problems and problems that relapse on part of the work force. Two types of problems are generally taken.

- Problems concerning functional aspect
- Problems concerning behavioural aspect

These problems can be solved if the engineers, supervisors and workers come together. In QC, the domain area concerned is the work force. The essence of QCs is to bring the craftsmanship or self-control element back to groups of people rather than individuals. The aim is to provide all the means by which employees can control their own

performance, both individually and in group-based activities.

The concept goes far beyond simple problem solving, although problem solving is usually the point where they start. **Hutchins (1992)** mentions that the results achieved in Japanese organisations would have never occurred if the Japanese had seen QCs as merely problem-solving activities.

The following issues are worthwhile for understanding the basic theme of QC.

a. QC-Size

According to **Udpa (1992)**, the optimum number of members in any QC is about 8 to 10. If the QC is formed with less than 5 members, then the Circle would lose its vitality as, due to high rate of absenteeism, a Circle may become inactive. At the same time, more than 15 members in a Circle could result in deprivation of opportunity for active participation by everyone in the Circle.

b. Restriction

The members of a QC need not always be the blue-collar or white-collar workers. It is desirable that the membership of QC should include workers working in the same area or engaged in a similar type of work.

c. In the same work-area or doing similar type of work

A QC is a homogeneous group and not an inter-departmental or inter-disciplinary one. Members participating in Circle activities must be on the same wave length. It is possible to have intelligible discussions in the meetings, if the Circle includes employees working in the same work area or engaged in a similar type of work. Designations of members need not necessarily be equal but the work in which they are all engaged should be common.

d. Voluntariness

It is essential that the members join QCs voluntarily. It is the voluntary nature of QCs that makes the concept totally different from all other concepts adopted and practiced so far. Employees decide on their own to join or not to join QCs and no coercion or pressure is to be brought on them. Moreover, no one can be barred from joining these Circles by virtue of his/her being a union leader or if he/she is lacking in proper qualifications.

e. QC Meetings

According to **Udpa (1992)**, normally QCs should meet for about an hour every week. There are some instances of meetings of QCs being held only once in a fortnight. The danger of having QC meetings at longer intervals is that the intervals may tend to lengthen till eventually meetings are stopped altogether. Whatever may be the frequency decided upon by the QCs themselves, the regularity of such meetings is of great importance and must be adhered to.

f. Problem-Solving Method

According to **Sharma (1998)**, the employees who work in any work area day after day know best what problems are hindering towards achievement of good quality, productivity and optimum performance and also how these problems can be removed. Members of QCs themselves identify, analyse and resolve work-related problems. According to Udpa (1992), it is important to understand that volunteers enrol themselves as QC members to solve work-related problems and not other extraneous issues such as grievances or demands. The latter are better tackled by trade unions, grievance committees and other similar bodies.

g. In Paid Time

According to **Hutchins (1992)**, it is important to mention that QCs' meetings may be held in 'paid time' rather than 'normal working hours'. In some cases, it becomes difficult or impossible to hold the meeting during scheduled work periods. This may be particularly relevant in shift work operations, when Circles may sometimes span shifts. If the Circle comprises members from each of three or more shifts, it may be possible to hold the meeting during an overlap between two shifts, but the members from other shifts will either miss the meeting or have to attend outside shift time. The pay arrangements for this will have to be worked out between all concerned, not of course overlooking the views or the arrangement of the non-circle members. Contrary to popular belief, Circle members in Japan are also paid for their time when these situations arise.

h. Autonomy

An important ingredient of a QC is the sense of autonomy experienced by its members. The members of a QC may, for the first time in their work life, have such an experience. Their tryst with autonomy starts when they are told that the participation is absolutely voluntary. Moreover, the members experience autonomy in the process of

choosing their leaders and selection of work-related problems.

i. Enrichment of Members' Work-Life

According to **Sharma (1998)**, the spin-off benefits of QCs to the organisation include enrichment of the working life of their employees, apart from attitudinal changes, cohesive team culture, etc. This is the result of avoidance of drudgery due to stereotyped work because of rejections, an improved working environment, happier relations with co-employees and greater job satisfaction, etc.

j. Leading to improvement in their total performance

QCs resolve work-related problems such as quality, productivity, cost reduction, safety, etc., which, in turn, leads to improvement in the total performance of the work area, resulting in both quantifiable and intangible gains to the whole organisation.

Unique feature of QCs

QCs, which has evolved in Japan in the 1960s and has since then been not only alive but steadily increasing unlike some other techniques such as Management by Objectives or Zero- Defect programmes which were once popular, but are unheard now, have the following features that makes it unique:

a. QC is a philosophy - not a technique
b. QC has a bottom - up approach - not a top - down approach
c. QC is voluntary - not coerced or compulsory
d. QC is management - supported - not directed by the management
e. QC is truly participative
f. QC is a group activity
g. QC involves task performers or grassroots employees

Objectives of QCs

It is always said that a well-defined objective is the stepping stone to the success of any programme. The following objectives can be accomplished in a QC programme:

a. Self development

Training is considered to be one of the main elements of a QC programme. In order to enhance knowledge every member of a QC gets eight to ten hours of training. Training fulfils the two fold needs: first it helps a member to understand the organisation's needs and, on the other hand, the knowledge acquired through the training helps to promote success in other areas of life. The problem-solving techniques of QCs include Pareto Analysis, Cause and Effect Analysis, Check Sheets, etc., are so easy to understand that they can be used anywhere to analyse and solve problems. In a broader sense, QCs help the members improve their abilities and develop themselves to the fullest extent.

b. Mutual development

It inculcates group or team work. Organisations with selfish interest and vertical ambitions cannot benefit from QCs. In QCs, people get to know each other and there is a feeling of 'togetherness' to combat the growing competition, inflationary and other problems of the organisation.

c. Improvement in quality

Improving quality is a never-ending process. In today's highly competitive environment, if an organisation has to survive, then it must try to satisfy the demands of the consumers who constantly demand better quality products and services. A QC is one of the best ways for solving problems and improving the quality image.

d. Improvement in communication and attitude

The importance of good communication cannot be understated. QCs help to improve communication since the group activities help to increase the frequency of communication among the members. People become open minded and they feel free to discuss the problems of the organisation. This, in turn, helps to change the work atmosphere and the development of a more positive attitude.

e. Waste reduction

One way of looking at quality improvement is reduction of waste in material, rework and time. Often it has been seen that organisations treat the symptoms of waste by adding some temporary operation without going into dealing the disease. According to Ingle (1985), many QCs have helped reduce the waste by deciding to work together and help each other.

f. Job satisfaction

It is very important that people feel enthusiastic at work and take pride in it. One way of achieving it

depends on the opportunities given to the workers to use their ideas and brainpower. QCs provide an ideal structure whereby it satisfies the 'achievement' need of an individual since they are aware that their ideas will be considered. Over time, Toyota's primary goal for the QCs has zoned in on developing team members and increasing their satisfaction. Toyota did not have a single layoff since 1952 (Bedi, 2008).

g. Cost reduction

With inflationary trends, it becomes absolutely important for organisations to take measures to reduce cost. Today most of the organisations in Japan concentrate on cost reduction. One way of reducing cost is to present costly items to the QCs and ask them to reduce the cost without compromising on quality.

h. Improvement in productivity

Reducing cost and eliminating waste helps to improve productivity. **Lal (1994)**, mentions that QCs have improved productivity in Bokaro Steel Plant located in Bihar.

i. Improvement in safety

Although every organisation intends to improve the safety of its employees, yet, it becomes increasingly difficult to understand all the hazards and problem areas that should be watched and improved to eliminate accidents, The QCs can play an important role in identifying and presenting the major safety changes that are required as recommended by the members at work place.

j. Problem- solving opportunities

Brainstorming is one of the techniques used by QCs to solve problems. This gives the members adequate opportunity to solve the problems and take pride. At the same time, they feel themselves a part of the organisation. Brainpower is unmatched as a mean of solving problems.

k. Projects are circle efforts

The circle, as a whole team, receives recognition for any achievement it has accomplished. No individual, whether the management or the shop-floor worker, can individually claim any success of a project.

l. Projects are work-related

Individuals or departmental problems are not dealt with. Problems have to be related to members' own department or work-area, though advice may be sought from other QCs. It is based on the assumption that members are the experts in their own field as what they do but not at what other people do.

m. Mental awareness regarding 'we' and 'they'

QC encourages leadership quality and personal development within a group. It facilitates effective use of channels of communication, thereby, assuring improved interpersonal relations and bonds of brotherhood. It urges people to receive ideas with an open mind and to participate positively.

n. Absenteeism and grievances are reduced

Members in QCs have realised that QC programmes have helped them enjoy work, a feeling of belongingness which has made them attend work places more enthusiastically rather than abstaining for minor reasons. Grievances too automatically get reduced since most of the work-area problems are solved by the member themselves.

o. Work ethic, discipline and trust

These are considered to be the pillars of success for any QC. Trust is the corner stone of organisations in Japan where it is considered fundamental to success. Self-discipline, ethics and tangible unquantifiable trust among all result in incalculable benefits for the organisation.

According to **Bedi (2008)**, QCs are employing management objectives and are making organisations profitable. It has been recorded in Toyota Georgetown that the savings in 1991 was $747,000 whereas in 1997 it was $19.9 million on account of QC activities.

QCs - The Indian Scenario

It has been acknowledged that the first publicly-announced successful programme of QCs was in BHEL, which was one of the largest engineering and manufacturing organisations in India in 1989-90. In about thirty-nine months, the number of Circles in BHEL rose from the initial 5 to 860 with nearly 8000 members in different divisions all over the country. In 1989, there were in all over 1600 QCs in different divisions of the company.

QCs have been implemented in a large number of organisations in India and the QCFI is promoting in a big way the growth of QCs in India. QCFI was founded in April, 1982, as a non-political and non-profit organisation, to promote the QC concept in

India. In the recently held International Convention on Quality Control Circles (ICQCC-2009) held in Philippines, QCFI organised the participation tour from India. Nearly 57 QCCs participated from India in the competitive stream. India bagged 21 gold, 16 silver and 20 bronze medals and topped the table. **(Quality Circle India, Volume 27(4), Oct-Dec 2009)**

The following is the list of some of the reputed QCs and the organisations in which those are operating in India.

Name of the QC	Name of the Organisation
Vikas	Apollo Tyres Ltd., Vadodara
Polevault	Ashok Leyland Ltd., Ennore
Unique	Bharat Petroleum Corporation Ltd., Mumbai
Aakash QC 54	BHEL-EDN, Bengaluru
QC-104	BHEL, Trichy
Prahari	Exide Industries, Haldia
Lakshya	HAL (Engine Division), Bengaluru
Novel	HAL, Hyderabad
Prerna	Hero Honda Motors Ltd., Dharuhera
Samanvay	Kirloskar Oil Engines Ltd., Pune
Scavenger	Nicco Parks & Resorts Ltd., Kolkata
Superhunter	NTPC Ltd., ISTPS, Kaniha
Flora	Titan Industries Ltd. (Watch Division), Hosur
Pragati	Godrej Consumer Products Ltd., Malanpur
Friends	Hindustan Zinc Ltd., Agucha
Himalaya	Lucas-TVS Ltd., Puducherry
Jyoti	Reliance Industries Ltd., Hazira
Adarsh	Tata Motors Ltd., Mumbai
Udaan	Tata Power Company Ltd., Mumbai
Iris	Indira Gandhi Centre for Atomic Research, Kalpakkam

Source: *Quality Circle India, Volume 27(4), Oct-Dec 2009*

It could be mentioned here that, in India, the credit for introducing QC in educational institutions goes to the students of City Montessori School (CMS), Lucknow, who were the pioneers in setting up, in 1993, Students Quality Circle (SQC), Jai Jagat, world's first QC run by the school children. The concept was pioneered by Mr. J.Gandhi in 1993.

Concluding observations

QCs have no cultural or economic boundaries. Since QCs are based on a 'people-building' philosophy, and the basic motives of recognition and self-fulfilment exist in all people, the concept should work anywhere and at all times. The idea of QCs is recently being introduced in the service sectors. Hospitals, departmental stores, banks, and insurance companies also need to cut down on waste and to improve quality of the services they render and QCs are playing an important role in this quality building process.

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