

STUDENTS QUALITY CIRCLES

Towards Building a Total Quality Society

An innovative concept and practice for schools and colleges to develop Quality mindset in students for the corporate world and the society



KAMRAN MOOSA
ABDUL WAHID MIR

Quality in Education Think Tank (QiETT)
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Quality in Education Think Tank (QiETT)
of International Academy for Quality

This book is one of the research works of Quality in Education Think Tank (QiETT) of International Academy for Quality (IAQ) for the benefits of educationists of different countries. QiETT is aimed at producing relevant contributions related with:

- 1) The roles that quality principles, approaches, and tools, as well as the quality community in general, can play in promoting and reinforcing quality in education, and
- 2) Lessons, experiences, and knowledge that the quality community can learn and recognize coming from academia and its different actors, including students, teachers, school administration/management, families, employers, and society in general.

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Foreword 1

As Chair of the Quality in Education Think Tank (QiETT) of the International Academy for Quality (IAQ), I am very proud to have Kamran Moosa as one of our members, who accepted to write, together with Abdul Wahid Mir, a very interesting paper for our increasing library of White Papers (available at the IAQ website), dedicated to Student Quality Circles (SQC), which bring the QC philosophy to schools and its students. This White Paper received very positive feedback from our QiETT and provided a sound starting point for this book.

The authors describe here the evolution, processes and outcomes achieved by SQC in different Asian countries, based upon their own experience and empirical evidences collected from Pakistan, where strong SQC activities are being led with impressive results.

I want to congratulate Kamran and Abdul for having written such a nice and inspiring description of the powerful SQC concept and activities. This book can help all of us to realize that it is never too early for being introduced to fundamental quality principles and basic quality tools, with SQC being an excellent way for doing so. As is shown and reflected also on the title of the book, SQC can play a major role in building better citizens, organizations and societies. This book may help to leverage and scale this experience, by motivating additional students, schools and

countries to adopt SQC. Let's therefore hope that the SQC movement will become larger and larger all across the world, since a world with more SQC will become for sure a better world. By writing this very nice book, Kamran and Abdul Wahid provide a nice contribution for that to be the case and deserve being congratulated for doing so.

Dr. Pedro Saraiva
Dean of Information Management School
NOVA University - Lisbon, Portugal
Chair of the Quality in Education Think Tank (QiETT)
International Academy for Quality (IAQ)

Foreword 2

I am astounded by the thought and content that has gone into the creation of this book. In my opinion it deserves the widest possible circulation and, in my opinion, deserves an award. It is absolutely excellent.

If I might add a little from my personal experience. The Schools movement that you so clearly describe as you point out has its roots in the City Montessori School Lucknow. Another high achiever in India is the Little Angels School but there are now many others. There were many in Japan in the 1960s undoubtedly some in the USA in the 1970s and some in the UK in the late 1980s.

Another country of note in this respect is Nepal where through the work of Dinesh Chapagain and their organization QUEST, Student Quality Circles were included in the National Schools curriculum and when I was there in 2016, they claimed that there were over 28000 children across the country skilled in QCs.

So, it can be seen that with the numbers in Pakistan, India and Nepal we are looking at a huge movement where now 100s of thousands of young people are not only being introduced to the Quality related Sciences and Disciplines but they are totally immersed in them as a way of life.

It is my opinion that we in International Academy for Quality (IAQ) should take Kamran Moosa and Abdul Mir's work to form a bedrock of a section of our activities, and I would be more than prepared to devote some of my time to it, with two objectives.

1. To help revive interest in Quality Circles globally but as part of TQM and,
2. To attempt to create some sort of international network of post graduate students who grew up in this movement to retain their involvement in the subject when in employment.

I am conscious of the fact that very few people really appreciate the power of Quality Circles when they are part of Hoshin Kanri and TQM. Of course, all of us have our specific interests in different segments of our very broadly based profession but I would willingly join up with any who have the desire to push this forward.

David Hutchins
Chairman, David Hutchins International, UK

Executive Summary

Students Quality Circles or SQCs in short, are basically miniature level activities of what the Japanese Quality Control Circles (QCCs) are in the corporate world. These activities prepare students for the Quality mindset from the very early age, thus engraving their personalities with Quality. SQC is an innovative concept and practice used as a part of schools' or colleges' co-curricular activities since mid-nineties in many countries of Asian sub-continent. The objective of SQCs program is to develop and prepare students for the corporate world as well as for a quality living in the society. A research study was carried out by the authors in 2020 where SQCs are practiced in many schools for the last more than ten years. The objective of this book is to explain the SQC concept, benefits and its application in schools with the help of findings of a national survey. The survey was conducted in a number of schools with their teachers, students, principals and management to find out how effectively they are being managed. The book explains the origin of this concept and the differences in the practices of QCCs in the corporate world versus SQCs in the schools. It discusses how effectively students are practicing SQCs and how effectively they are implemented and managed by schools and colleges. Critical success and failure factors of this program are identified and highlighted. The book provides practical guidelines to educationists and management of schools, colleges and universities who want to initiate or improve their existing program. The recommendations are pro-

vided at the end which can add value in the current concepts and practices of SQCs. The book identifies the strength of this unique and innovative program in building a society towards world-class quality. The authors strongly recommend this non-traditional but powerful program to be implemented in schools, colleges and universities in all countries. It is hoped that this book will benefit educational institutions in different countries to further improve Quality mindset in their societies through this program.

CHAPTER 1

Students Quality Circles

The Vision

THE BIRTH OF QUALITY CIRCLES

Quality Circle or Quality Control Circle (QCC) is one of the most popular and structured methodologies of Quality Management used in the corporate world in dealing with and making improvements in organizations. This methodology was initially practiced by companies like Toyota and Nippon, etc. and propagated by a number of Quality gurus, like Ishikawa, Deming and Juran in late fifties and early sixties. The Japanese Union of Scientists and Engineers (JUSE) initiated this as a formal country-wide campaign to build the foundation of their industry on self-driven quality improvement activities as part of employees' job responsibilities; rather than an independent department driving and forcing quality upon process owners as in the West. They built their foundation of quality imbedded within each process, by all individuals actually producing quality.

According to JUSE, it established a QC Circle Headquarter in early 1962 and also started publication of a monthly

magazine, called QC for the Foremen. By 1978, it included an estimated 10 million Japanese work people (Hutchins, 2019). In the same year, it was claimed by JUSE in their publication *Gemba to QC Circles*, that there were more than one million quality circles involving some 10 million Japanese workers. As of 2015 these circles spread and operated in most East Asian countries. It was also claimed by the President of the Chinese Quality Circles Society at the ICSQCC Conference in Beijing 30 August 1997 that there were more than 20 million quality circles in China (Wikipedia, 2020). According to JUSE, QCCs are now reported as being practiced in more than 70 countries. The QCC activities have been practiced in Japan in all types of industries, from manufacturing to services. Their national promotional activities also included radio broadcasting series on QC for Front-Line Supervisors in 1956-, and two-weeks QC Circle Cruising Seminar inaugurated in 1971 which departs from Tokyo and tours various Asian countries to visit other QC Circles in different countries (Kondo, 1995).



Figure 1: Japanese QCC in action

According to Ishikawa (1990), QC Circles are small groups of people from the same workplace who carry out quality control activities voluntarily. These small groups carry out self-development and mutual development as part of company-wide quality control (or total quality management) activities and use QC tools to control and improve their workplaces continuously, with everybody taking part. These small groups operate as autonomous groups and use quality control concepts and techniques with many statistical and improvement tools. The basic philosophy of QC circle activities carried out as part of company-wide quality control is to:

1. contribute to the improvement and development of the corporate culture
2. create cheerful workplaces that make life worthwhile and where humanity is respected
3. exercise people's capabilities and bring out their limitless potential

The management of organizations practice overall Total Quality Management and Kaizen, in which QCCs are one of its elements, providing guidance and full support to the members of QCCs. Managers attend QCC meetings as observers, receive QC circle activity reports, support the circle's activities, and check their work. The responsibility for encouraging and promoting QC circle improvement activities always lies with the management (Ishikawa, 1990).

QCCs is one part of TQM methodology which is a broader umbrella of engaging employees of all levels in organizations for making continual improvements as part of their routine job. Japanese refer continuous improvement as

Kaizen program. Literary meaning of Kaizen is ‘change for betterment’, a theme around which the QCCs operate. They encompass the concept of never-ending efforts to make improvements through involvement of everyone at every level in the organization. As people are engaged in a structured problem-solving process working in groups throughout the year, their organizational deficiencies are continuously removed, resulting in enhancement of their products, processes and capabilities. The main theme behind QCCs is to develop and change the mindset of front-line workers and supervisors, from just an observer or creator of problems to a critical thinker and problem solver; thus, eliminating the need for any watch dog of quality within an organization. QCCs are regularly trained and empowered to focus their minds on critical observations, root-cause analyses, experimentations and solve the problems within their own processes. If they are not sufficiently trained, motivated and supported, they will not be able to achieve their goals and solve problems effectively.

The term ‘problem’ could mean any shortcoming or deficiency in the quality of products, services or processes. Even if there is no short-coming, the groups work in a creative domain to introduce new ideas or innovations in their processes to enhance quality and productivity. As the QCC activities expanded in Japan, the learning curves of employees as a nation, gradually improved. Critical thinking in employees and harmony among themselves improved considerably, as a national outcome. With the initial success, the themes of problems taken up by QCCs also expanded to include improvements in productivity, efficiency, cost reduction, design, safety and production control, etc.

FROM CORPORATE QCCs TO STUDENTS' QUALITY CIRCLES (SQC)

In 1994, Citi Montessori School (CMS) in Lucknow - India experimented and initiated the concept of QCCs with students of their school (CMS, 2020). With the gradual success of this activity, the idea soon spread to many other schools within India and many neighboring countries. Through collaboration among various other institutions of different countries, CMS further formed an international association by establishing World Council for Total Excellence in Education (WCTQEE) in 1999, with representatives from many countries, including India, Nepal, Bangladesh, Sri Lanka, Pakistan, Turkey and Mauritius. In addition to holding annual International Conventions on SQCs, some of these countries also started their National SQCs Conventions. Among these are: Sri Lanka Association for Quality (SLAQ, Sri Lanka), Quality Circles in Education for Student's Personality Development - Nepal (QUEST, Nepal), Bangladesh Society for Total Quality Management - (BSTQM, Bangladesh), and Empowerment through Quality Education, Innovation and Productivity - (EQUIP, Pakistan). The collective mission of these societies is 'to globally promote and establish Total Quality and Excellence in education and groom children to become Total Quality Persons'. With these promotional and developmental activities, Quality has started influencing the lives of students and teachers in these countries where SQCs are used with professional approach and methodology.

GROOMING THE SAPLINGS

Sapling term is used for a small young tree in its very initial stages of life cycle, after it has come out of the surface of earth. This is the stage where utmost care is required. Growth pattern at this stage mainly determines the future of the tree's shape, strength and the benefits it can provide. Similarly, the schooling age is analogous to sapling. At this stage, the personality of a grown human being is initially crafted in students through their family members, community and schooling. This includes the initial formation of children's and teenagers' behaviors, habits, values, ethics, skills and even physical outlook. Teachers and school systems, in addition to students own families and the community, play a vital role in the formation of the right type of their personality traits and mindset. One of the major requirements of any progressing community is the Quality mindset of its citizens. When students enter the corporate settings with the basic skills and mindset of Quality, they become an asset for the organizations from the very beginning of their jobs, resulting in better quality of products and services available to the society and its socio-economic elements. Sapling's age is the best age for the adoption of quality values and practices in the personality development of students, as it becomes part of their DNA.



Figure 2: Saplings require protective growth

It is also important to note the difference between Values and Norms. They are not the same, e.g., raising the national flag on a holiday is a norm, but it reflects the value of patriotism. Similarly, Customer Complaint Handling Procedure is a norm, but it reflects the value of fulfilling customer commitment. Similarly, auditing is a norm, but it reflects the value of accountability. If we want to see the quality outcomes in daily lives of professionals or citizens, we have to practice quality in our day-to-day activities. However, claims of Quality practices or norms without belief in the values behind them result in just rituals, and can never have longevity, whether in a society or an organization. If quality norms or practices are to be implemented effectively in a society or the corporate world, they have to be built upon quality values at an early stage of life. If we groom children and students at schools, colleges and universities with quality values and practices in their day to day lives, a total quality society is bound to form. Individual's quality values lead to societal quality values; which ultimately becomes the foundation of the desired culture of excellence, as shown in the above figure. The values behind the quality norms result in societal

quality outcomes. An SQCs program implemented in educational institutions nourishes students with the right values and practices of Quality at an early stage and contributes towards a total quality society.



Figure 3: Quality outcomes are results of quality practices and values

THE VISION OF SQCs A TOTAL QUALITY SOCIETY

Many states and countries struggle to form common values in their societies for creating excellence in the quality of their living. Schools are one of such tools to form common set of values in citizens of any country in pursuit of Quality. However, the school curricula alone is mostly not sufficient in developing various personal traits in students which are required by our societies and the corporate world. Thus, co-curricular programs are essential to develop progressive mindsets of students. Sports, debate

clubs, literary societies, art galleries, military training and science clubs, etc. are all various forms of co-curricular activities in schools and colleges for augmenting the curricula in building different life skills in students. The intensity and quality of co-curricular activities differ from school to school because their management are generally not accountable on that. In fact, poor quality or lack of co-curricular activities reduces tremendous burden and overheads from schools' management, but on the other hand, adds-on a great burden on the society in developing a healthy and progressing human being. National educational goals cannot be achieved without effective co-curricular activities. Over-emphasis in curricula and under-emphasis in co-curricular is mainly the result of putting greater focus on just employability of students and less on other societal needs which are required for its progress and growth. In quest for better jobs, most schools and colleges, together with students and their parents, loose focus on co-curricular activities; resulting in half cooked citizens. Most underdeveloped and developing countries are particularly victims of such phenomenon.

Every organization or business, whether private or public, small or large, manufacturing or services, healthcare or education, military or civil, etc. require people with relevant quality mindset, health, values, body of knowledge and skill sets. If they don't find people with these specific requirements, they try to develop them by themselves to cater for their specific needs. If there is a large gap between what they require and what human resources are available to them, then they try to import from other communities or countries; or else remain impotent. This makes the whole society vulnerable to poor quality of products and services in their day-to-day transactions by

virtue of their weaker human resources; resulting in poorly managed systems all around, un-sustainable processes, disruptions in day-to-day societal affairs, poor governance and mistrust among societal members.

Creating a Quality mindset in citizens is one such popular concept in many rapidly progressing countries like Japan, Korea, Singapore, Turkey and Malaysia etc. The formation of Quality mindset in their people is one of the top agenda items of their Quality associations or societies. For example, Malaysia 2020 program provides six Strategic Reform Initiatives (SRIs), out of which three revolve around Quality, i.e. (1) Competition, Standards and Liberalization; (2) Public Service Delivery, and (3) Human Capital Development (World Bank Report, 2017). It is unimaginable for a society to grow without developing higher standards of quality values, knowledge and skills sets in its people through various educational or human resource development programs.

Unlike Japan and few other countries where a child is born within a Quality society, the exposure to quality in day-to-day life is occasional in most other countries. Bits and pieces of high-quality services and products are experienced in day to day lives of people. Most people experience high quality working environment only when a person gets into a quality conscious company. This could be the person's first job, or in some cases any subsequent job at mature age. In countries where Quality is not effectively practiced by majority of employers, most professionals don't even get the feel of quality values and practices throughout their whole lives because they never got the chance to work in an organization where quality values and practices are part of their day-to-day culture. With

wide variations of quality practices in different organizations, the exposure to quality also differs from company to company, or even school to school or university to university. If a company's culture comprises of positive values and practices in its workplaces, the person will also behave accordingly. On the other side, if its culture comprises of negative values and practices, the person will usually build those poor habits, values and practices. This is the reason why poor-quality mindset of employees do not let the organization, industry or business prosper. The development of higher standards of Quality mindset and values are needed at the early stage of a person's development lifecycle so that by practicing quality, he becomes a useful entity in the development of national quality brand through families, societies, businesses and the corporate world.

Based on the above rationale, the Principals and owners of the schools and colleges should consider SQCs as an important program or initiative to prepare and develop Quality mindset in their students not only by introducing SQCs among students, but also by establishing Total Quality Management (TQM) program in their school systems. With this vision, SQCs will take the shape of a value-added activity. Those principals who adopt SQCs without its correct vision can not achieve the desired goals, except that they showcase this activity in their prospectus for marketing purposes.

CHAPTER 2

What are Students Quality Circles?

Students Quality Circle or SQC in short, are basically miniature level activity of what the QCC is in the corporate world. It prepares the habits and mindset of quality management practices in students from the early age, thus engraving their personalities with Quality. SQCs are a co-curricular activity for students which provides an opportunity to learn and solve real life problems related to students by teamwork and with data driven scientific methodologies using statistical and analytical tools. Students are asked to form SQCs as part of their co-curricular program. They are then provided training in SQCs philosophy, values and statistical tools. They are asked to select their own group leader and work in teams for few months on a specific real-life problem through system's approach. Problem selection is done by themselves. The facilitators ensure that the problems they select correspond to their mental age and from among the issues related to them, their classes or their school, or from their community affairs in which they are involved. These circles are facilitated by trained SQC facilitator(s) appointed by the school management, who act as internal trainers, coaches, organizers and motivators for these circles.

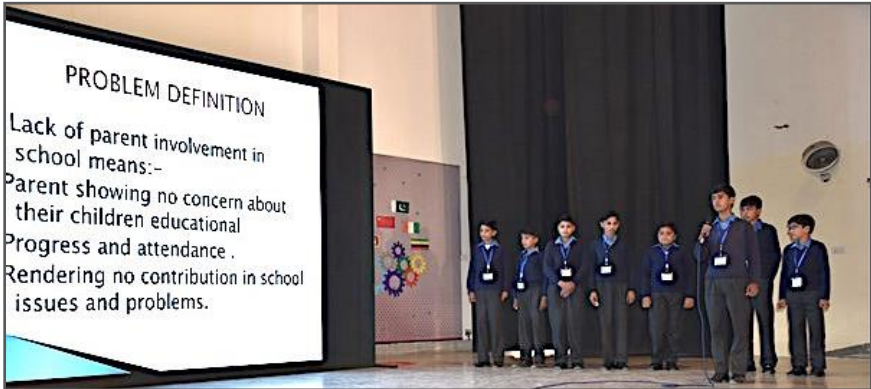


Figure 4: SQC presenting their report in SQC Convention

SQCs are autonomous groups of students who are driven through a research process by studying the problem in depth and coming out with not just the proposals to solve problems, but also implement the solution in real life scenario. The usual duration of problem-solving cycle ranges from 3-6 months, with 4-8 students in a group. Once they complete their projects, they prepare PowerPoint presentations or reports for the internal school's SQC committee and present in front of other students and teachers. These presentations sensitize and motivate other students to take part in SQC Program and thus become a reason for growth of SQCs in the schools. These students are also prepared to present their projects for the national and/or international SQC Conventions, if such opportunities are available to them.

SIMILARITIES AND DIFFERENCES BETWEEN QCCs AND SQCs

The key differences and similarities between QCCs at the company level and SQCs at the school level are given in the following table:

Table 1: Similarities and differences between QCCs and SQCs

	Quality Control Circles of the corporate world	Students Quality Circles of schools and colleges
Formations	Volunteers, with advice from their supervisors	Semi-Volunteers. Students are asked to select and join SQC as part of their co-curricular activity. However, it is the students' final decision to join or not.
Circle Size	Usually 4-8	Usually 4-8
Members' age	Usually, 20-60 years	Usually 10-18 yrs. in school, 18-25 in colleges/universities
Circle Leader	Selected by circle members	Selected by circle members, the facilitator may also advise
Composition	From the same workplace or department	No restriction to be from the same class/grade. They can be from different classes/grades, but preferably with the same mental age.
Goal	To actually control and improve their workplace related products, services, processes and/or outcomes	SQCs are not meant to actually control quality of their school, rather go through a real-life problem-solving exercise for learning and building scientific research and problem-solving skills, and personality grooming through team work.
Theme selection	Selected by the circle. It relates to their own departmental problems based on	Selected by the circle and facilitated by the facilitator, as students may not fully

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	strategic drive for quality.	comprehend the problems manageable by them.
Theme topics	Related to improvement in Quality of their products or services, processes, Productivity, Cost Reduction, Innovation and waste	Learning aspects and discipline, classroom management or other students related issues compatible with their mental age and abilities. Sometimes students also select problem from their community issues.
Duration	Usually, 2-4 months with one-hour formal weekly meeting	Usually 3-6 months with one-hour formal weekly meeting. However, these meetings can also be divided into different breaks during school hours. These are not planned during exams.
Period of activity and life cycle of SQCs	Groups continue for many years by selecting different problems at different times	Should be continuous; however, it is observed that in most schools these groups are disbanded after their first project. This needs to be changed to make it a continuous process, with one project after another by the same group/SQC.
Support and motivation	QCC Facilitator and their departmental heads; financial rewards and awards are also attached to this program.	SQC Facilitator and their teachers. Teachers trained on the vision of SQCs can only develop the right kind of interest in students. SQCs are recognized within school and in conventions with some token awards.

Use of Statistical & other Quality Tools	Seven Basic Tools, Seven Management Tools, 5S, Poke-Yoke, etc.	Only selected tools from the Seven Basic Tools, e.g., Check Sheets, Graphs, Pareto, Cause & Effect diagram, Control charts, Brainstorming, etc. Considerable scope exists to include other tools like 5S, Poke-Yoke etc.
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ARE SQCs PART OF SCHOOL'S TQM PROGRAM?

As stated earlier, one of the differences between QCCs in companies and SQCs in schools is that QCCs in the corporate set-ups is a part of real company-wide quality improvement initiatives; while SQCs are not necessarily part of school's TQM program. Many teachers and school principals new to the idea or even running SQCs for some time, confuse SQCs as part of their school's TQM program. They think that this activity is aimed to improve quality of their school through engagement of students. Generally, this is not a correct perception. Although this activity could be made or developed as one of the elements of the school's TQM program but, by itself, it is not a program aimed to standardize and improve the institution's academic and administrative processes, policies, process management, teachers' accountability, and the learning outcomes. The scope of problems selected in these projects usually revolve around students' classroom affairs, community affairs, or school activities where students find problems related to them and have some control

to resolve them at a limited level in their classes. There are chances that students may pick projects related to some weakness of their classes only where they have some control and may even fix them, but there is no compulsion by school's management or teachers to formally accept their solutions and institutionalize them. This is evident from the fact that the problem and its resolution may not be mature enough to implement it in the existing system or may not be the priority of the school. In case the school management wants to implement TQM, they have to make QCCs of teachers and administrative staff of their school by empowering them to make real life interventions and improvements, the way corporate sector does. This will also require a totally different set of roles, committees, skill sets, key performance indicators and accountability systems to drive the organizational TQM program, which is beyond the scope of this paper.



Figure 5: An SQC reporting to school management

BENEFITS OF SQCs

SQCs can provide tremendous benefits in the development of teenagers and youngsters in building the Quality mindset, only if they are effectively implemented. Secondly,

students may not fully achieve the benefits if they only take part in it with the understanding that it is just a class assignment and is meant to get some marks in the exam results. One SQC project per student in the student's life cycle is also not sufficient in achieving the desired results and benefits. Students have to participate in more than one SQC projects in order to develop the required skill sets and its values.

SQCs are meant to develop certain characteristics in the personalities of students, which are generally not possible in the usual school's academic environment. This activity not only prepares them for better future employability but also make them a better asset for their society.



Figure 6: SQCs representing their schools in the SQC Convention

SQCs influence the students in the development of following three types of behavioral changes and skill sets, i.e. (a) Management Skills, (b) Soft Skills, and (c) Technical Skills. Not all these skills are produced with the same maturity and in the same manner. A lot of variation is observed in students who participate in different SQC projects. This variation could be due to various factors, e.g.,

the strategic priority and placement of SQC program by the school, quality of facilitators, students and teachers' training on SQCs, the nature of problems selected by students and effectiveness of administrative arrangements of SQCs in the schools.

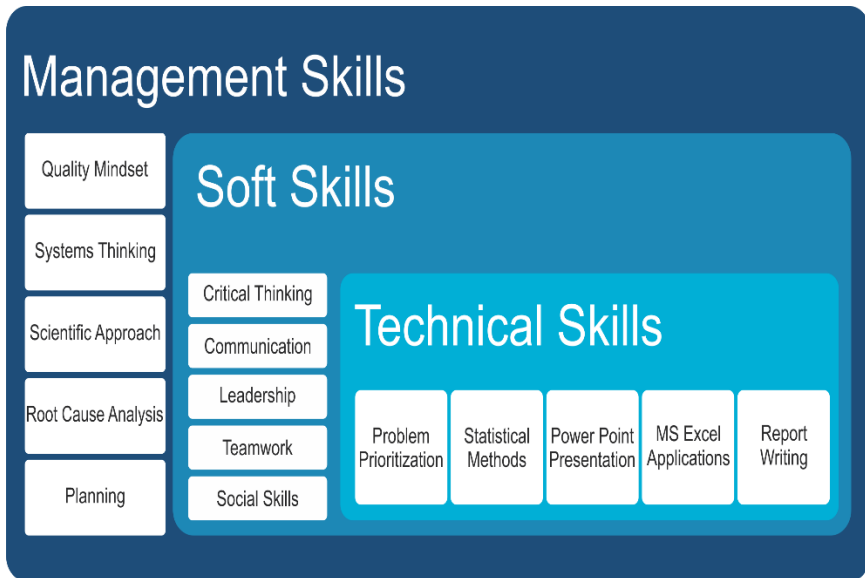


Figure 7: SQCs benefits

The probable development of skill sets are shown in the above figure. A brief description of each of these areas is given below:

MANAGEMENT SKILLS

Quality Mindset: This is the understanding and use of the word 'quality' in its professional context, i.e., as a fulfillment of customer requirements and satisfaction or conformity to a policy or standard operating procedure. While choosing a problem for the project and subsequently studying the need for a change, the students understand

Quality as an outcome of a process which can be improved through changing various process factors contributing to the problem.

Systems Thinking: One of the core foundations of Quality Management is the concept of systems thinking by all the stakeholders involved. By definition, 'Systems thinking is a wholistic approach to analyze the relationships between the system's parts to understand the potential for better decision-making. The system isn't just a collection of things or activities; it consists of elements, inter-connections and a purpose (GOFOR, 2018). Students have ample time and opportunities to study systems relevant to their problems and process elements which create issues, problems and undesirable outcomes.

Scientific Approach: Study of systems with sufficient relevant past data and its validation creates a scientific approach to problem solving in students. The solutions are tested and verified in real life through collection and processing of data to understand the context. In this way, solutions are also validated after bringing the changes and collecting again the data after the interventions. With this approach, the thinking of students change from intuition-based problem solving to scientific based problem solving.

Root-cause-analysis: This is another important management and leadership skill. It is also important for the sustenance of any system because problems are mostly created due to non-compliance or ineffectiveness of processes or their inter-connections. Students are driven through an extensive exercise of root-cause-analysis of the problems that they select, using various statistical and analytical tools. They also learn how to do Cause & Effect and

why-why analysis to find reasons which are creating problems.

Planning: The real-life problem-solving cycle is converted into a project, with the help of facilitators. Students are required to start with a feasible plan to solve the problem with projected timelines, roles of individuals in the group and relevant activities that they have to perform. They do so by detailing out the steps (work breakdown activities) required to accomplish the solution and an understanding of the resources required to do so.

SOFT SKILLS

Critical Thinking: It is defined as ‘the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action’ (TFCT, 2020). Critical thinking is considered self-guided, self-disciplined thinking which attempts to reason at the highest level of quality in a fair-minded way. Furthermore, people who think critically consistently attempt to live rationally, reasonably, and empathically. Successful development of critical thinking also leads to better quality of decision making in day-to-day life, i.e., developing the ability to derive logical conclusions from different options available with a pragmatic approach. The students go through various stages of critical thinking in the real-life project that they select under the guidance of their facilitators. However, in some cases, it is found that facilitators provide spoon feeding to students in solving the problem or writing the reports. In such cases, it kills the whole purpose of SQCs, and more

importantly fail to develop critical thinking. However, it is generally hard to notice and recognize this violation.



Figure 8: SQC of senior high school students giving their presentation

Communication & Confidence Building: SQCs provide a platform for even shy and non-communicative students to improve their communication, in real life scenario. This not only includes the on-going verbal debates among themselves or with the facilitator, but also collecting data in interviews and presenting their results to different SQC committees or in national conventions. Presenting and debating with audience of different ages and groups develop better communication skills and confidence in them. SQCs can play an effective role to enhance the oral fluency of students in the target language.

Leadership: SQCs are structured on the concept of team building. It comprises of team members and their leader. Members usually select their own team leader; however, the SQC facilitator can also sometimes nominate the team leader. The SQCs as a team have ample opportunities to develop and display leadership skills. Leadership skills are

developed in SQC Team Leaders by engaging and influencing their team members with balanced work and provide them with appropriate directions, reinforcements and recognition as an inspiration to accomplish their SQC objectives. The student leader has to also solve conflicts among members and take veto decisions. In order to prove their point of views, the leaders have to ensure that team members have to practice democratic values through open participation and developing the required skills in order to convince other members of their point of views and creative ideas. However, this is only possible under the correct guidance of the facilitators who understand leadership aspects and are well trained.

Teamwork: Teamwork is an essential element of any successful corporate culture. A team is a group of individuals working together collaboratively to achieve their common goal. Teams normally have members with complementary skills and generate synergy through a coordinated effort which allows each member to maximize their strengths and minimize their weaknesses (Wikipedia). In normal school classes, students are also given group assignments in their courses, which is also an activity for developing teamwork through academic work. However, in case of SQCs, it is different. Teamwork in SQCs revolves around real life problems and may extend up to 3-6 months in a single project life cycle, with a common aim to solve the real-life problem. Moreover, the teams are not formulated by the teachers or facilitators in SQCs, but members are selected by students themselves. They usually include like-minded persons or friends. With such a team dynamics, the team spirit grows in a better way; that is how it is generally experienced in QCCs in the corporate sectors.

Social Skills: With ample communication by the SQCs with all the stakeholders in the form of surveys, interviews, observations, and conflict resolutions, many students develop or improve their social skills, which the academic and competitive class room environment sometimes fail to achieve. These include: empathy, relationship management, active listening, respect, etc. However, this depends a lot on the group's leadership and facilitators' role.

TECHNICAL SKILLS

Structured Problem-Solving skill: Japanese QCCs use a standard process of problem solving, also known as 'QC Story' (more discussion in the next section). Students have to go through a series of standard problem-solving steps in order to come up with workable solutions. These structured problem-solving steps are from the systems thinking point of view where problems are not just addressed from the surface but include deep root-cause analysis to explore systems non-conformities or weaknesses.

Statistical Methods: The Japanese QCCs use basic applied statistical methods in solving about 70% of common systems related problems. These simple techniques are labelled by Ishikawa (1990) as 'Seven Basic Tools of Quality Control'. They are: Basic Graphs and Stratification, Check Sheets, Pareto Diagram, Cause & Effect Diagram, Histogram, Scatter Diagram, and Control Charts. In case of students' circles, not all these seven tools are used. Most students generally use only the first four. Building the habit of using these tools prepare the students for analysis of common issues in their daily lives or in their professional lives.

PowerPoint Presentations: Effective presentation is an important professional skill required in every corporate set-up. Students go through various exercises of presentations during SQC life cycle, using PowerPoint. Thus, they develop the abilities to present themselves and their ideas in a confident and convincing manner. This is specially polished in SQCs conventions when they present in front of large audiences with questions and answers from them on their projects. Facilitators should always train them to make slides but should never make the slides for the students.

MS Excel Software Applications: Students are taught to use few software applications, e.g., MS Excel. In some cases, even Minitab and Visio (for plotting flow diagram) are also found being used by some student groups. In order to build the skill, the facilitators should themselves be trained on the use of these applications and should train to develop the basic skills in students. Again, they should not solve the problems by using the MS Excel themselves.

Report Writing: Students are required to present their work and findings in the form of a report. They also observe different reports and projects of other SQCs. This improves their reporting skills.

PROBLEM SOLVING STEPS USED BY SQCs

Once a group of students are registered with the facilitator, they are first trained on SQCs principles and tools. Subsequently, they identify problems which they intend to solve and then they start studying and solving the problem through the problem-solving cycle. As mentioned earlier,

the real aim of SQCs is to make students go through a process of rigorous cycle of scientific methods with teamwork and positive spirit in order to understand the real-life issues and how to investigate through systemic approach, using data and statistical tools. In this hands-on process, they are supposed to improve their mindset on Quality and develop special skills as described earlier.

The problem-solving procedure widely used in Japan by QCCs, is generally known as QC Story. Kondo (1995) explained that the QC Story started out as a standard format for reporting examples of problems solved. Subsequently, people realized that it was an effective procedure for actually solving problems, and it became widely advocated for this purpose. The QC Story was adopted and adapted by SQCs to match students' intellectual capability, as their mental level is lower than working professionals. As a result, simpler problems are selected by the students based on students' mental level and age.

The general steps of QC Story taken by SQCs are shown in the figure and are as follows:

Theme selection: Brainstorming on identification of possible issues related to students and rating them in terms of their priorities.

Reasons for choosing the topic: Rational decision making based on priorities as well as available time and resources.

Identification of the current situation (facts and stratification): Initial survey for the purpose of investigation and data collection through questionnaire, interviews and/or secondary data collection.

Setting Targets: Set the appropriate targets for improvements.

Analysis of results and processes (investigation of assignable causes): Study and analysis of data gathered through step 3, using statistical tools and stratification techniques.

Countermeasures of corrective measures: Exploring with creative solutions to resolve the issues based on investigations and interpretation of data. Implementation of the solutions are carried out.

Confirmation of counter measures: Testing the solutions with trials of solutions and confirming with the proof that it works, otherwise coming up with other possible solutions.

Standardization and recurrence prevention: Providing standard operating procedure to ensure consistency and effectiveness of the solutions.

Future plan and consideration for other problems: After fixing the current problem, the SQC identifies and suggest another problem which the same group will attempt to solve after closing the current one. In principle, SQC should not be disbanded with the completion of one project; the team should continue with another project which they have identified at the end of their initial or current project.

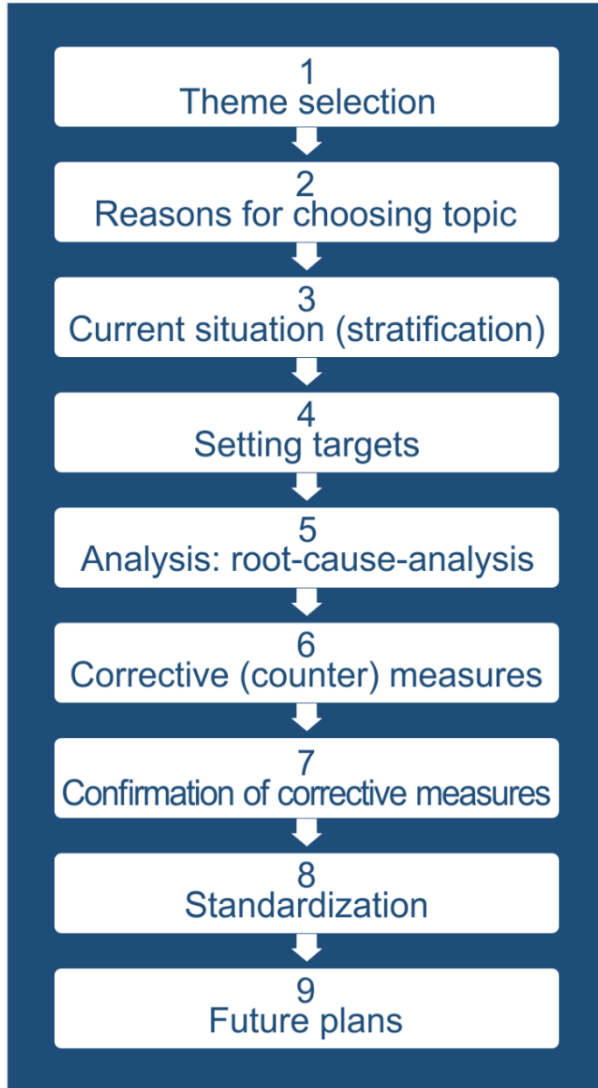


Figure 9: Problem solving steps used in SQC

CHAPTER 3

Management of SQCs?

After getting motivated by participating in SQCs conventions or reading success stories, many school leaders underestimate the organizational dynamics of SQCs. As a result, they rush to launch this program in their schools or colleges with a strong enthusiasm, but without the required planning, resources and management controls. Most often such programs fail and result in loss of trust by the students, the principals and teachers/facilitators.

Moreover, instead of studying the root-causes of such failures and rectifying them, the principals and teachers lose interest in this program, resulting in its premature death. They tend to believe that this program by itself has flaws and weaknesses, rather than understanding their own management weaknesses in its implementation. After interviewing a number of students and SQCs past participants, it was found that those schools where the program was found weak had immature leadership and/or ineffective management procedures.

While it is important to envision SQCs in their correct perspective, it is even more important to lay down effective processes with clear roles of all the stakeholders, including the principals, facilitators, teachers, students and

other management staff involved in this program. The program will not be sustainable after its first or second year, if its processes are not developed and controlled effectively. To bring it to a mature level, the management of this program requires strong sponsorship, especially in the first few years of its launch. Based on the principles of effective management and best practices of SQCs in different schools, the proposed framework is shown in the above figure based on Deming Cycle (Plan-Do-Study-Act) which is the foundation of any sustainable system.



Figure 10: PDCA Framework for Managing SQC Program

A brief description of this framework is as follows:

LEADERSHIP

This is the most commonly used word by management and perhaps the least understood and practiced, in general. Many managers and teachers, as well as employees at the lower level, use this word exclusively for top management.

The factors behind any successful program include the right vision and commitment of its leaders. However, Leadership is highly contextual and means different things to different people under different circumstances; even literature is full of diversified concepts, theories and explanations. It is not the scope of this paper to debate and analyze this term and its associated practices; however, few key aspects of leadership in managing SQCs program are important to discuss:

1. Leaders have strong foresight into the future, i.e., they are driven by their vision. This does not mean creative ideas, or a wish-list, or just the desires; but a belief and commitment to the long-term goal of the SQCs. Adopting SQCs just to add-on a co-curricular activity to the school's brochure or prospectus, without focusing on its long- and short-term outcomes will not lead to achieve the desired goals.
2. The major prerequisite for initiating SQCs in any school is the total understanding of, as well as complete conviction and faith in the participative philosophy, on the part of the owner/principal and senior management of the school. In the absence of a commitment from the Principal to support the SQCs movement, it would be unwise to start this program.
3. Creating motivation in both students and teachers is the responsibility of the principals. However, if teachers do not promote this program in their classes with a strong commitment and honesty, the program will never get the status that it deserves. Thus, all the teachers must be engaged and taken into confidence in this program by arranging appropriate and effective training and awareness programs on

SQCs. In this way, burden will not lie exclusively on the shoulders of the facilitators to promote it.

4. Assigning formal roles and responsibilities of facilitator(s) as well as teachers is required.
5. Strong commitment to develop and run this program on a long-term basis should be ensured rather than as a one-time (or one year) activity.

PLAN

There is a popular saying that ‘failing to plan is planning to fail’. Based on observations of SQCs program in different schools as well as interviews with relevant staff, effective planning was found as one of the important elements of management, which included activity schedules, timelines and roles/responsibilities. The following activities are important for planning SQCs in any school:

Steering Committee: Every SQCs program needs a sponsor at the highest level of school management; which could be the Principal or preferably an SQC Committee, which may include the principal or vice principal, facilitator(s), and representatives from teachers, students and admin staff. Weak sponsorship would mean weak system and implementation.

Program Facilitator: Preferably, a full time or a part time person is required who is knowledgeable and competent on SQCs vision, policies, procedure and statistical techniques. This person should be selected very carefully as the operational effectiveness and efficiency is heavily dependent on his/her attitude and capabilities in SQCs. This person should spare reasonable time for SQCs and will be responsible for the promotion of this program, providing training and coaching to faculty and students involved in

SQCs, and writing and maintaining the documentations, etc.

Teachers Engagement: Teachers are the ambassadors of this program. Selected teachers should be designated as SQC Ambassadors. All the teachers of the school should have the basic know-how of SQC vision, benefits and procedures. They should promote this program in their classes, from time to time. The sponsors and facilitator(s) should conduct regular training and review sessions with the teachers to align the program to meet the teachers' need and concerns as well.

Development of Students Guidebook: The Facilitator should develop a guidebook for the students on SQCs. This could be in the form of a small document and a video tutorial covering a best practice of SQC in action, from start to the end of its process.

DO

SQCs operations are started and carried out in this phase in accordance with the plan and the SOP. The management structure and the procedures are practiced as defined in the 'Planning Phase'. In the 'Do' phase, operationalization of the following activities is carried out:

Program Launch: It usually takes the shape of a launching ceremony with all the senior management, teachers and students. This could be done in some special event, e.g., morning assembly or announcements in classes on a specific day. Banners are developed to motivate students on this activity with briefing by the Principal and the facilitators on its values, benefits and SOPs. An un-noticed launch usually gets a poor start.

Students Registration: Students are asked and encouraged to register on volunteer basis. This is not just done in the opening ceremony but teachers (ambassadors) are asked to motivate their students in their classes. Once the students show their interest and decide to form a team for the purpose of an SQC, they contact the Facilitator (SQC Office) and register themselves as a SQC, with a unique name. The facilitator registers them in a log book and assign them the meeting timing, days and venues for conducting SQCs. This is a careful activity, as the facilitators are faced with a challenge of ensuring that the SQC timings do not deprive the students from any of their academic lectures, lunches or other breaks. It is observed that some schools assign a separate make-up class for these students, while others assign them the breaks or library timings. In various interviews with the SQC members, it was found that many students disbanded their SQCs just because they thought that SQCs were interfering with their classes or other important breaks.

Parents Engagement: One of the most important elements which discourages many parents (as well as students) is the common perception that involvement in extra-curricular activities keeps the students away from their studies and reduces their academic performance. Thus, they consider this as a big risk factor for their kid's failure in future. Both students and parents need to be taken into confidence with solid arrangements/arguments to ensure that SQCs meetings are held in convenient time and environment. In any case, the SQC policy should ensure that the time spent on SQC meetings is properly compensated so that the students do not lose or get a feel of losing any academic time due to this activity.

Students Training: When students are registered, they are given training by the facilitator. This training includes: the clarity on the SQCs group dynamics, how to select a problem, the roles of the team leader and members, problem solving steps, root-cause-analysis and basic statistical tools. In addition, skills are also developed on the use of Excel and PowerPoint.

Coaching to Students: The initial awareness training given to students is just preparing them to start the SQC activity. They usually cannot proceed without regular coaching during different phases of problem solving. For this reason, they also require regular coaching by the facilitators to ensure that their meetings are being carried out in a disciplined fashion and that they are not stuck in problem solving. It is also ensured by the facilitator that they go through the complete cycle of problem solving (described in the previous section). However, it is observed that in some cases, students are given answers and solutions by the facilitators; and in some cases, they are spoon-fed the whole problem-solving cycle, just to prove the high performance of the circles in the conventions. This is a highly damaging activity which is generally not noticed by school management. Thus, the principals are required to ensure that such practices are strongly discouraged and stopped. Every problem should be solved completely by students themselves. Facilitators should only guide on the principles and use of tools.

Process Management: The SQCs being run in any school require effective monitoring and controls to make sure that these groups are being run according to the set principles and procedures. The facilitator has an important role in the management of these SQCs. He/she must have

a planner in which the timings and locations of different SQC meetings are noted. He/she should ensure that the SQCs are being run as planned. All groups should be properly facilitated throughout their problem-solving life cycle.

SQC Seminar / Convention: It is important that the work of SQCs is displayed (along with team's photos) or showcased to all other students through in-house seminar or convention and/or LED display boards placed in the SQC Office or at some visible place in the school. This is an important step as it motivates and encourages other fellow students in building their Quality Mindsets.

STUDY (CHECK)

The next stage of starting the SQC operations is to design a system of reviews, evaluation, audits and feedback from all the stakeholders, including the SQC leaders, facilitators, steering committee members and teachers. The in-depth study or review is necessary and reflects an important aspect of quality assurance for the SQCs program being implemented. This may include the following:

SQCs Monthly Review: A review of all stakeholders is conducted on a monthly/bi-monthly basis which includes SQC Team Leaders, Facilitators, Representative Teachers (ambassadors), Principals, etc. This is an important activity to ensure sustainability and longevity of the program.

KPIs & SQC Dashboard: This is an important monitoring tool but found missing in most schools. Every system requires Key Performance Indicators (KPIs) of key results against annual targets. Some of the important results to be compiled and reported by the facilitator in the monthly

reviews of SQCs are: Number of SQCs per year, average number of students per SQC, attendance rate of students in SQCs, Average duration of SQCs, SQCs completion rate, Student satisfaction Index of SQCs members, categories of problems being undertaken by students, etc.

Reports/Minutes: The monthly reviews should include minutes of the meetings so that all non-conformities, feedback and reviews are recorded and followed-up.

ACT

The final step in any systems-based thinking is to regularly resolve issues encountered by the management or students. Every school has its own context where the SQC general procedure has to be adapted to suit the working environment of the school, whether public or private, small or large, urban or rural, etc. It also depends on the available resources, competencies and priorities of each school. Based on the problems faced, the solutions are collectively developed and worked out. Similarly, performance of results serves as a basis to improve or change SOPs or plan. Most often, the issues detected are mostly non-compliances of SOPs, rather than ineffective SOPs.

CHAPTER 4

National Research on SQC_s

RESEARCH METHODOLOGY

A study was conducted on SQCs by the authors in Jul-Oct 2020 in Pakistan by studying a selected sample of Students Quality Circles and their school management and facilitators. SQCs are promoted in Pakistan for the last 11 years by a non-profit organization called EQUIP (Empowerment through Quality education, Innovation and Productivity) with its main sponsorship by Modernage Public School in the city of Abbottabad. Its vision is to create a Total Quality Society through the practices of total quality management. The organization endeavors to create a culture of collaboration and cooperation among student bodies by inculcating in them leadership abilities. For this purpose, EQUIP facilitates students at school level to learn data driven problem solving techniques through Students Quality Circles in which they put into practice the techniques that they have learnt. This organization provide students of different schools in the region and other parts of the country to exhibit their talent in their National Convention on Students Quality Circles (NCSQC) held

every year in the month of November, which is generally considered as the ‘Quality Month’ by various Quality associations throughout the world. By 2019, they conducted 11 annual National Conventions in the country.

Based on students from different schools who participated in the annual national convention of SQCs, organized by EQUIP-Pakistan, the authors selected 16 schools from six cities and approached their facilitators and/or principals to take part in the survey. Two survey questionnaires (for students and SQC Facilitators) and one open ended interview checklist for the principals were designed in Microsoft FORMS (an automated software application for conducting surveys). Due to Covid-19 pandemic, schools were closed during this period; so special arrangements were made through the facilitators to approach the students through emails and telephones. Links of Survey Forms were sent to them with a request to give their responses. The sampling frame was the list of students who participated in the previous SQCs annual conventions. In addition, selected samples of students, facilitators and principals were also interviewed on Zoom for in-depth clarifications and critical analysis. A total of 132 students and 21 facilitators were surveyed; moreover, interviews through Zoom were also held with three school directors and/or principals, 10 students and four facilitators.

Students Feedback

Exhibit A shows 67% of students were female (found better motivated in this activity) while 33% male with ages from 6 to 18 years. The grade-wise distribution shows 7th, 8th and 9th participated the most with ages from 6 to 18

years. The survey covered 95% participants from the private schools while 5% respondents from the government schools.

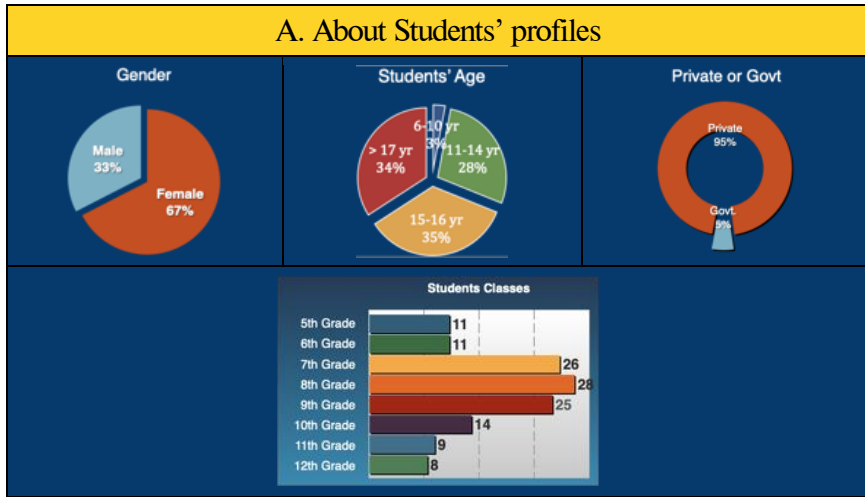


Exhibit B shows the profiles of the SQCs. We found that 30% of the respondents had been the Team Leaders while rest of the 70% were team members. Of these, 36% had only done one project while 30% did two and 17% did three projects. It was also found that majority of the students who participated in this co-curricular activity considered SQCs as an important development program for themselves. Majority of these students were motivated from the SQC conventions, while others from their teachers and facilitators. It was also found that majority of the students select projects on issues related to their learning or class disciplines. The exhibit also shows that almost all of the basic QC tools were used by the students in analyzing and studying the problems and their root-causes.

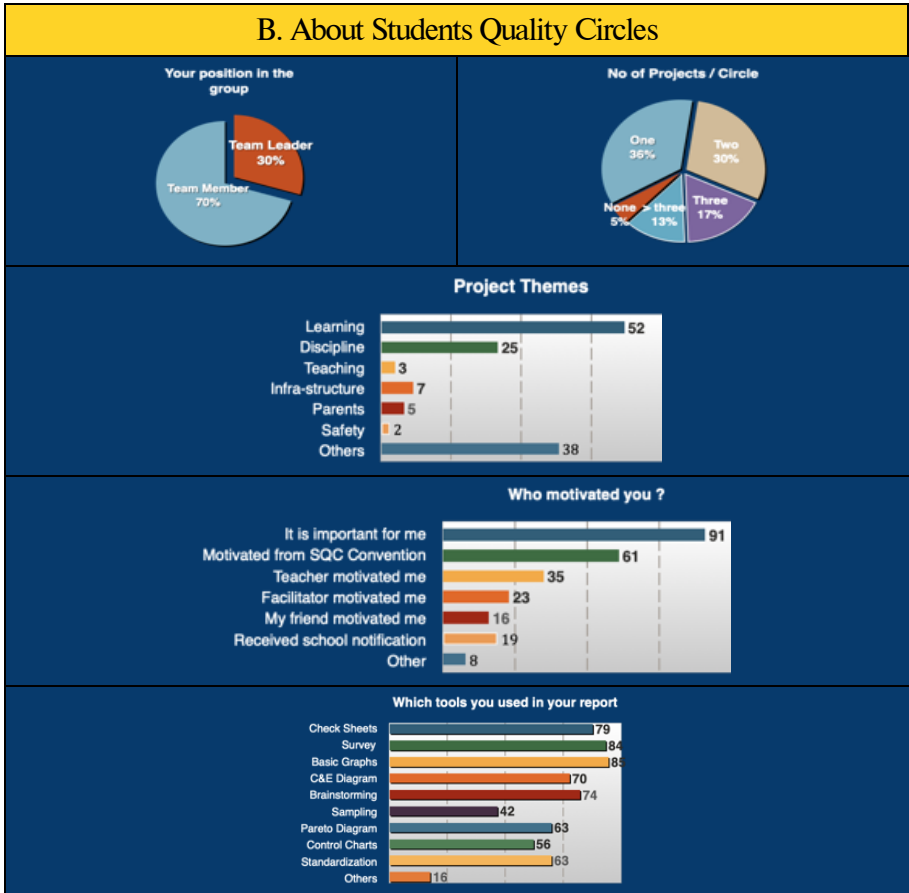


Exhibit C shows responses of students related to how they managed their SQC projects. 73% of the students considered that the leadership of their team leader was very strong. Project durations of these SQCs were from less than one month to 2, 3 and higher than 3 months.

Around half of the SQCs held more than four meetings in a month with meeting time of up to one hour in majority of the cases. Most of the students held their meetings during school breaks. While carrying out the interviews of students, we also learned that this was one of the biggest

challenges for students and generally a hurdle in the sustainability of SQCs by students. A complete discussion on this will follow in the later part of this study.

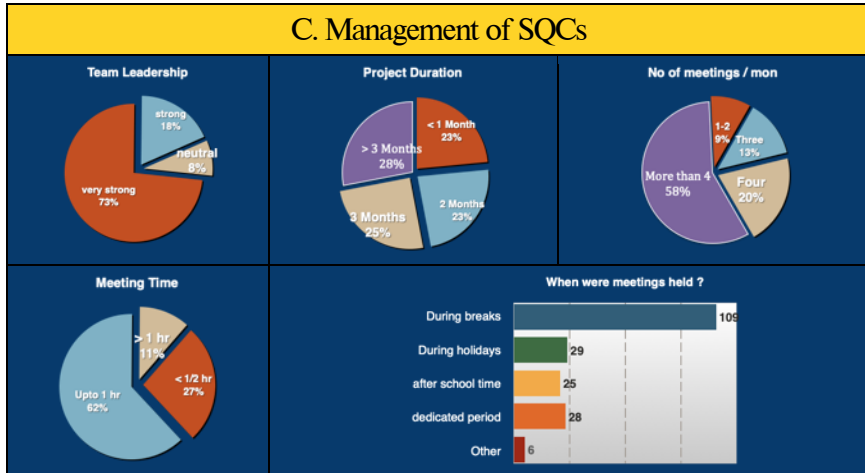
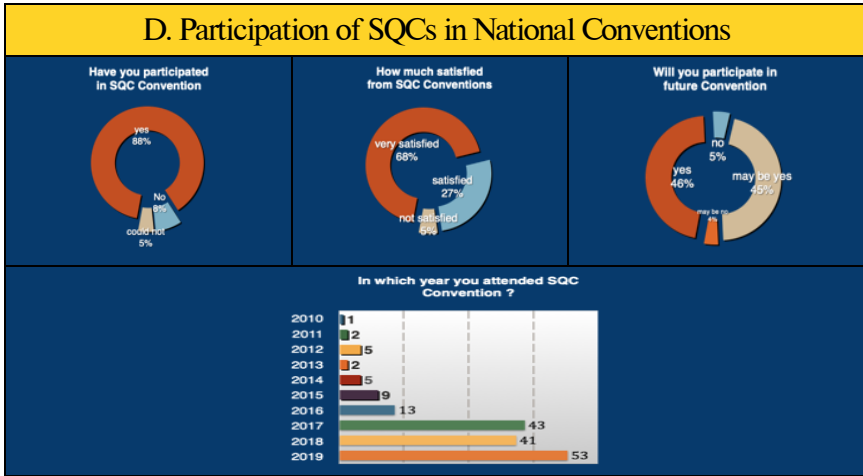


Exhibit D shows the responses related to students’ participation in the annual national convention organized by EQUIP, which has been found to be one of the key SQCs promotion platform in the country. Students were asked a number of questions related to the SQC conventions in which they participated. Most students who participated in the survey were from 2017-19 and majority were either highly satisfied or just satisfied (68% and 27%, respectively). When asked about their intention to participate in future; majority confirmed that they will. This shows that the SQC conventions are really important for the learning and motivation of students. In addition to national convention, a regional convention in one of the provinces is also held where different schools of that region participate. However, any local activity or seminars at the school levels were found missing, which is also an important element in the promotion and ensuring the sustainability of SQCs. In case of QCCs in the corporate

sectors, it is a norm that they hold an annual company level convention or seminar where all the company workers and management participate.



All the employees witness the success of QCCs in their company, resulting in creating motivation in other employees within a corporate quality culture and mindset. A sense of competition among employees is also enhanced for making improvements in their respective departments and functions.

Exhibit E shows the response to a series of questions related to the quality of facilitation provided in schools by the SQC Facilitators. Training and coaching were given to 92% of SQCs and it was found effective or just effective in 98% of students; while 58% students said that their facilitators held more than 10 meetings during the projects and 18% said 6-10 times, 11% said 4-5 times and 8% said 2-3 times. This shows extensive efforts by the facilitators to provide support to the SQCs. In terms of type of training, three areas were highlighted, i.e., general concepts of SQCs, 7 basic QC tools and PowerPoint. While this effort

was highly appreciable, it also highlighted that facilitators’ role was important to run the SQCs on a regular basis. From the interviews of the facilitators, it was also found that in majority of cases, comprehensive training at the beginning was not given; rather small chunks of instructions were given on weekly basis. As a result, students were always found dependent on their facilitators in every meeting to proceed further. Most of the time SQCs meetings lasted up to one hour, as shown in the previous exhibit.

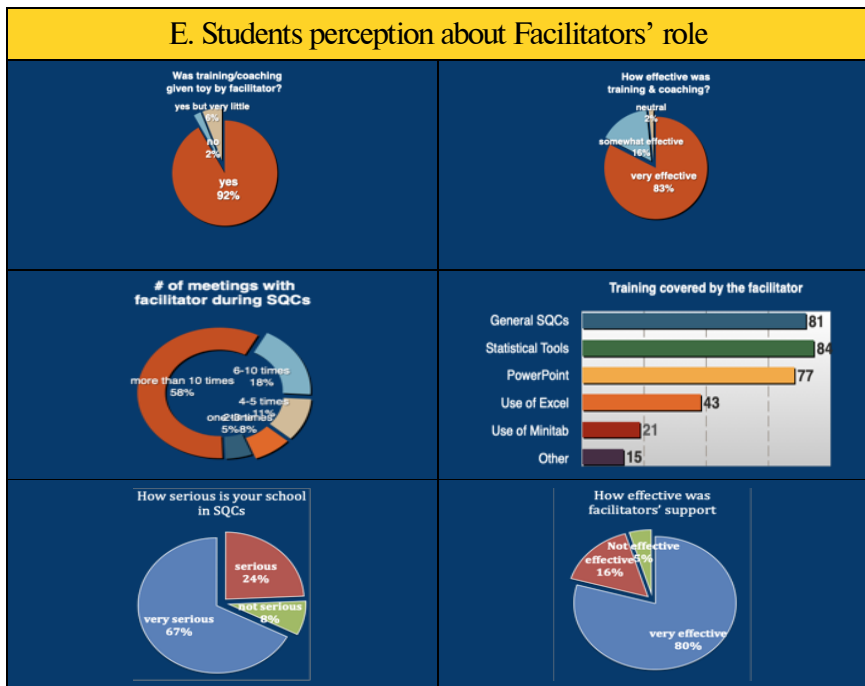


Exhibit F shows the feedback of students about their views on how effective were SQCs solutions and their implementation. Majority of students felt that their solutions were quite effective. However, in interviews with them, many complained that their school did not implement

their solutions fully. This led to some dis-satisfaction and discouraged that group to take part again in future SQCs.

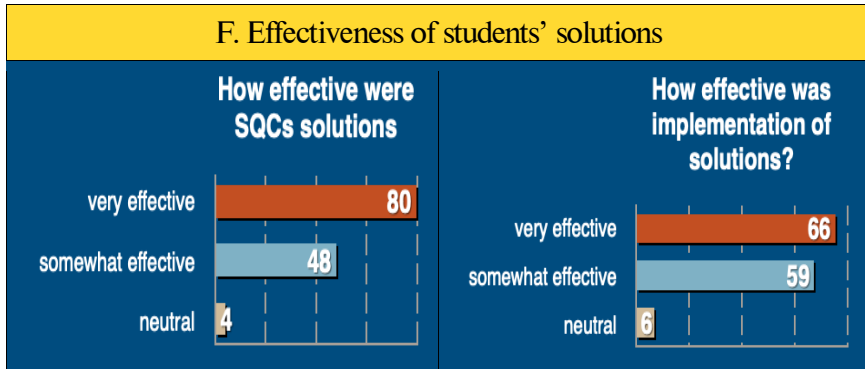
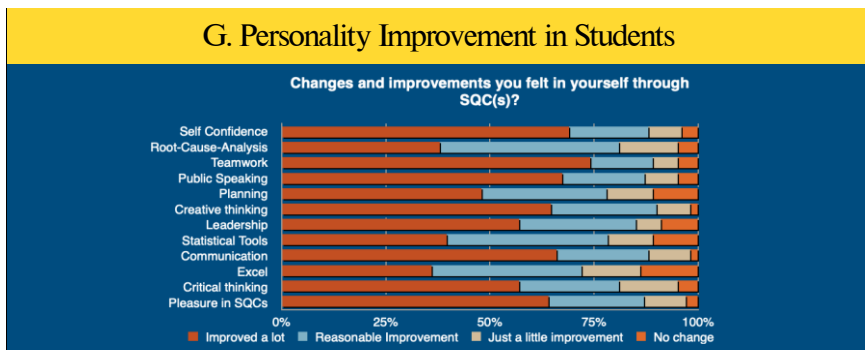


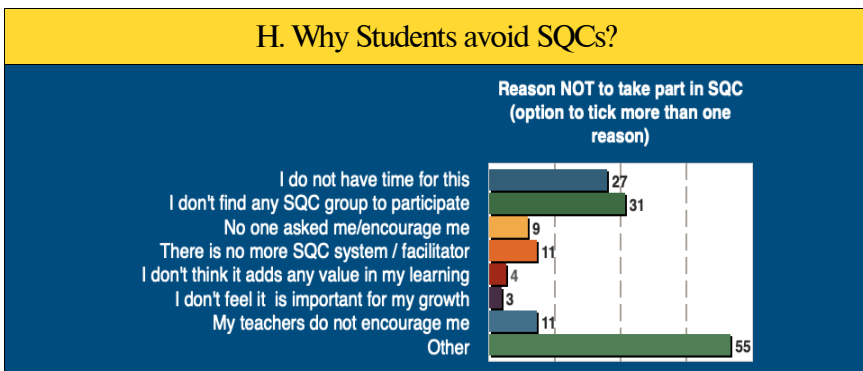
Exhibit G shows the achievement of SQCs goals and the improvement in the personality of the students. Students were asked to rate the changes they felt in themselves after completing the SQC projects. The result shows encouraging outcomes. According to students own perceptions, two levels of improvements were identified: (a) Category A - high level changes: these included self-confidence, teamwork, public speaking, creative thinking, leadership, critical thinking, pleasure in working in SQCs and better communication skills, and (b) Category B - low level changes: these included root-cause-analysis, planning, statistical tools and use of Excel.



This indicates the overall program has still some inherent weakness due to which certain areas are still weak and needs to be addressed in future. Detailed discussion follows in the next section.

One of the survey questions was about students’ perception on why so many students still do not believe in SQCs and do not join this co-curriculum activity. This also pertains to those who only join a single SQC and then do not continue it.

Exhibit H shows that two most important reasons why students do not join SQCs are that they do not find any group to join, and secondly, they think that they do not have time to participate in it. In the earlier discussion, it was also found that generally students are asked to participate in their school breaks or in any free or special period, e.g., library period. Students do not feel comfortable to waste their breaks or lose any of their other useful time, which they consider important. However, in some schools, it was found that the facilitator allotted them a special period in a week along with an extra period to cover any period which they have lost. In that cases, students were found much more satisfied.



Feedback of Facilitators: A total of 21 Facilitators responded to the survey. Out of these 10 were male while 11 were female with 2-11 years of school management experience. Ten were full time teachers while 11 were full time administrators.

Exhibit I shows that the facilitators were serving in this capacity ranging from 1 to more than 5 years; while their experience to supervise projects ranged from 1 year to more than 10 years. Most of them also indicated that they were motivated from the SQC convention and that they think that this activity is really important. Eight of them replied that the duty was just assigned to them from their management. It was observed that competitive annual increments are given to some facilitators as well.

One of the concerning issues was the different level and duration of training received by them; 52% of them received the training on SQCs which was one or less than one day. While 24% said that their training on SQCs was more than 5 days. During interviews, it was confirmed that the amount and nature of training received by most of the facilitators were inadequate. This was also confirmed from the replies of the students described earlier which indicated improvements required in the development of facilitators. Insufficient training of facilitators results in underdevelopment of students where the goals of SQCs were not fully met.

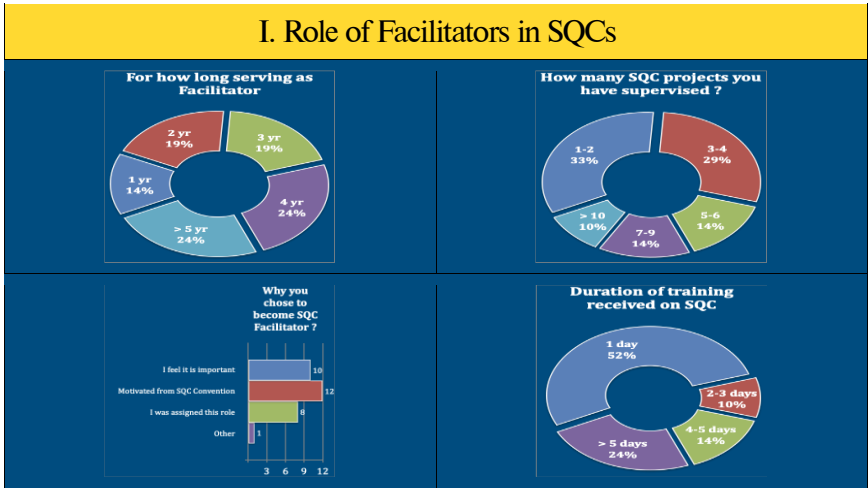
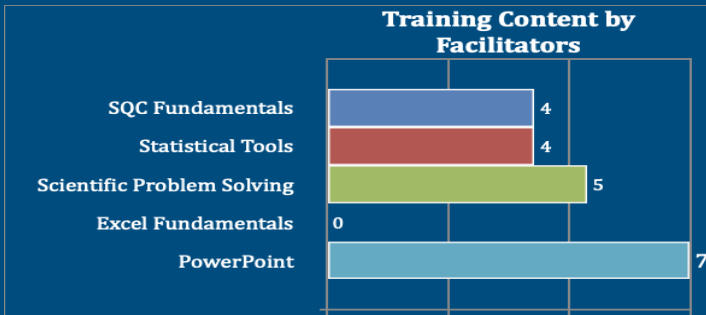
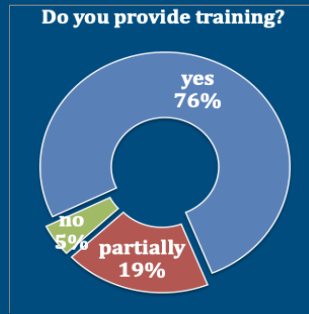
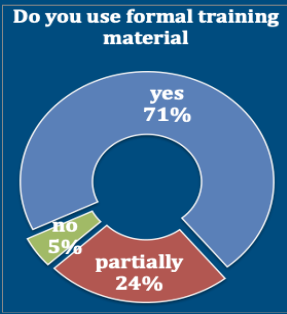


Exhibit J indicates the responses of facilitators on training imparted to students. According to them 76% of them act as trainers. 71% said that they use formal training material, usually in the form of PowerPoint slides. The training content included training on PowerPoint, scientific problem solving, statistical tools and SQC fundamentals. In interviews, it was also confirmed that training material for and by the facilitators both required more improvements. Although the level of depth of knowledge is not too exhaustive in case of SQCs, but the conceptual understanding of the SQCs and application of statistical tools needs special considerations, especially experiential learning.

J. Training given by the Facilitators



CHAPTER 5

Critical Analysis and Recommendations

SQCs VISION

The overall study reveals that SQC is indeed a powerful tool for producing a quality mindset in students. All the stakeholders who have experienced SQCs consider it a valuable co-curriculum activity for building a quality mindset of students. Observations from the interviews and the survey of students from various schools also confirm the benefits of SQCs are, in fact, a reality and not a myth. However, the survey did not include any feedback of students who have entered the corporate world after graduating from their schools. Consequently, result of the study includes the current students, teachers, facilitators and principals who were involved in the SQCs. Based on their observations, it was confirmed that SQCs is a useful tool in building the foundation of quality in a society.

On the other hand, the schools which were surveyed exhibited different level of commitment to SQCs; in other words, not every institution implementing it was found to have this activity on top of its agenda. Different levels of

maturity in SQCs was the result of different level of commitment by school management. The real intent or mission behind this program really decides the success and positive outcomes. If the program was found weak in commitment, the procedures implemented were found to be just rituals, rather than value added processes. Those schools who are running SQCs with full commitment display strong positive outcomes. The real commitment comes from beliefs ingrained through conceptual clarity and observations of successful cases.

MANAGEMENT OF SQCs PROGRAM

Special attention is required for the management of this program through monitoring, review and internal auditing. This can only be assured by systemic approach and effectively following all the phases of PDCA cycle of SQC procedure, as explained earlier. Halfhearted start-ups, unstructured implementation and insufficient resources by management are generally found to be the main reasons of failure in some schools. Some of the biggest challenges in managing this program are as follows:

SQC Timings: Most of the students reported that they conduct meetings during breaks, which turned out to be not the best option. This was found to be not only inconvenient to students but in many cases threat to their studies. In few schools, they arranged a special SQC period and covered-up their period as an extra period for them. In such schools, the quality of SQCs were found much better. Thus, arranging a special period for SQC is found to be a better option.

Teachers' Involvement in SQCs promotion: Very little material and activities were found for the promotion of SQCs. It was mostly left to the facilitators to promote SQCs among students, who sometimes visit classes and brief the students. Teachers were generally found aloof and not involved in its promotional campaigns. One of the reasons was that they themselves were not sufficiently briefed on and engaged in SQCs; resulting in lack of interest or commitment in this activity. It is important that all the teachers be sufficiently trained / involved in SQCs with formal and proper training. It was found that the conceptual understanding of SQC was generally missing in teachers; resulting in mis-understanding the vision of SQCs. In addition, very little printed material was found which is attractive for students. It is, therefore, recommended that SQC promotion should be planned thoroughly, especially through teachers. Selected teachers may be designated as SQC Ambassadors for this purpose.

Number of SQCs in a school: Most of the schools who have deployed this program were running only a few SQCs in their school in a year; which ranged from one to four or five SQCs, in majority of cases. However, in very few cases, 8-10 Circles were found. These figures only suggest an elementary stage in the maturity of SQCs. For a mature school, it would mean at least 20-25% of their students are involved in this activity at any time. In order to pursue the vision of SQCs, the schools have to invest in more efforts and resources to achieve the desired outcomes. Due to exams and other academic busy periods, the timelines can be planned accordingly.

Monitoring and Quality Assurance: The management of this program requires close monitoring, students' feedback, audit and regular reviews by the top management or respective committee responsible for this program. For all those schools where this program is on low priority, monitoring and QA was also of least concern. Weak QA also results in a high risk of in-effectiveness and lack of longevity of this program. Regular performance monitoring of the SQCs by the school's top management is important for this program to become a regular feature of the school.

SUSTAINABILITY OF SQCs IN SCHOOLS

It was observed that SQCs are only sustained on long term basis in a few schools; while many schools are not able to sustain this activity on a long-term basis, i.e., for more than 2-3 years. The following three main reasons were found by investigating why SQCs are unsustainable in many schools:

Students' Issues: Many students think that SQC activities waste their academic and study time. In a strict competition and race to get high grades in their classes, they only value those things which provide them better grades, like tuition, extra-coaching, etc. However, most students are neither tuned to or conceive this activity as an important tool to develop professional personality with quality mindset required in their future jobs and/or in entrepreneurship and personal lives. This is just due to lack of effective promotional campaigns. Parents and society are the main influence for this mindset. Exhibit H (discussed earlier) depicts the feedback when asked why students don't take part in SQCs.

Surprisingly, one fourth of students had the perception that it affects their academic studies, while other had altogether different reasons, mostly related to school management of SQCs. This included responses like: there are no groups which I can join, no one encouraged me, my teachers do not encourage, or lack of sufficient support and facilitation, etc. This is an important finding and suggests that there is quite a large number of students who are willing to join but lack of effective encouragement from teachers and timely facilitation in the formation of groups in the school system, forces them to stay away from this activity. A more forceful marketing/environment to attract students in SQCs is generally required to be strengthened. In our view, every school which starts SQCs with a strong vision also require some resources to promote them. Teachers are very important resources which are usually found to be underutilized in marketing of this program.

Confidence Building with Parents: Parents influence and most of the time are actual decision makers behind the consideration by students to join SQCs or not. In interviews with students, facilitators and principals on the role of parents, it has come to lime light that parents' denial seems to be one of the most influencing factors on students who do not wish to join SQCs. It was also found that those schools where SQCs are started late in the academic year, lose attention due to near-exam phobia. Thus, mere rhetoric of verbal confidence does not matter much unless the school prove that these activities do not affect exams. Unless this perception is mitigated through practical steps, chances of acceptability of SQCs are very dim.

Enhancement of Scope: In line with the QCCs of the corporate sectors, there is considerable scope to extend the scope of SQCs projects, from just Quality to Productivity, school maintenance systems, class room/school environment and Safety improvements, etc. Use of management tools can also be further expanded, e.g., 5S, Lean and lead time reduction and school safety/risk improvement, etc.

Number of Projects per Student: It was found that the concept of SQCs in most schools was like a one-time project. This is not the case in corporate QCCs. A QCC once formed usually continue for many years with different projects. Only because of continuity of such recurrent projects of different nature, build the Quality mind-set in students. Therefore, it is strongly suggested that the life cycle of SQCs should not be restricted to only one project, rather the same SQC should continue different projects for a number of years to reap its benefits.

Conclusions

This book is a report and comprehensive guide that provides information about ins and outs of Students Quality Circles (SQC) from practical point of view. It is meant to help interested parties understand what SQCs are, how they function, its key constraints and issues in implementation and possible solutions in order to make it a valuable co-curricular activity. The book includes a research study of a country where SQCs are implemented on a limited level for the last ten years. The research included a survey and interviews of all the stakeholders in the management of SQCs. The results identify the key success and failure factors in the implementation of these circles. The book identifies the strength of this unique program in building a society towards worlds-class quality. It is hoped that this document will benefit many other schools in different countries who may also learn the success and failure of SQCs at a country level.

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Annex A

Sample Presentation of a Student's Quality Circle of
Class V & VI

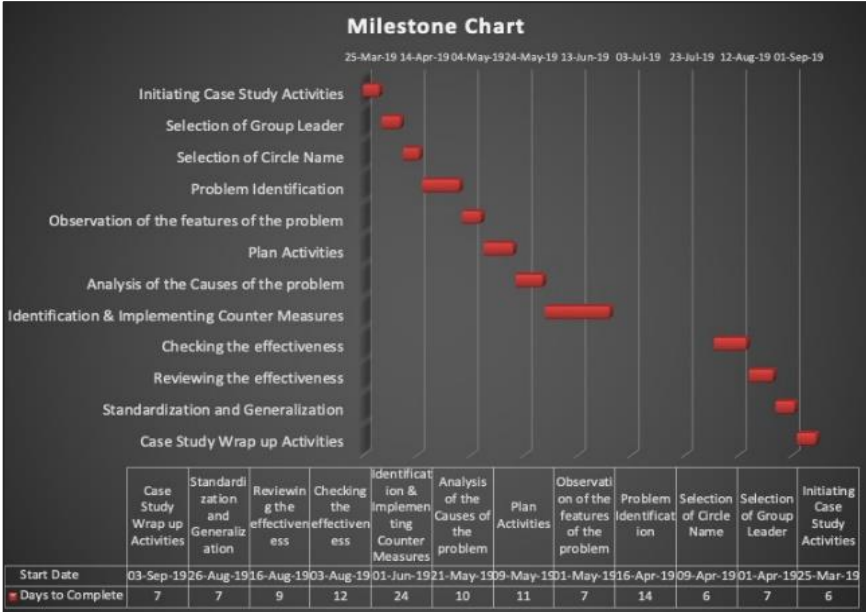
Courtesy

Modernage Public School & College

Selection Of Circle Name

Circle Name	Haider Ghani	Abdullah Kiyani	Alman	Zemad	Arqam	Total
Innovators	1	2	3	2	2	10
Bright Stars	2	1	1	1	1	6
The United Seiso	3	3	2	3	3	14

Tool used : Brain Storming & Voting



Selection of Group Leader & Deputy Group Leader

Group Members Name	Haider Ghani	Abdullah Kiyani	Alman	Zemad	Arqam	Total
Arqam	1	3	3	1	4	12
Zemad	4	2	4	2	1	13
Abdullah Kiyani	3	4	2	3	2	14
Haider Ghani	5	5	5	5	5	25
Alman	2	1	1	4	3	11

Tool Used: Voting

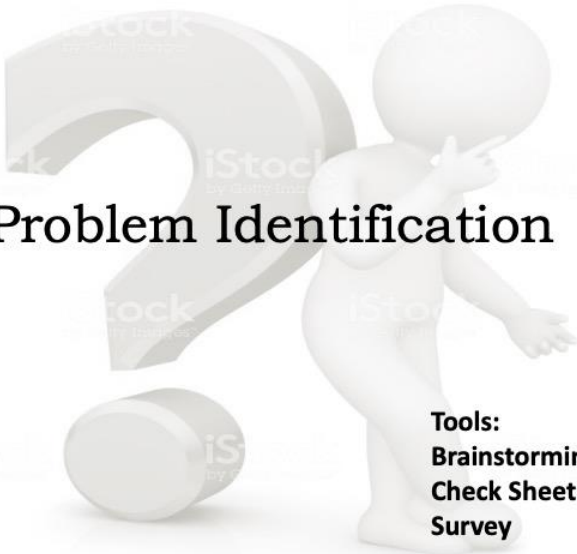
Members of the Circle

- Group leader : Haider Ghani
- Deputy Group Leader: Muhammad Zemad
- Reporter Name: Abdullah Kiyani
- Members :
Alman Haider
Arqam Bin Rashid



Introduction of the Circle

Name of the circle : The United SEISO
Group started date : 25 March 2019
Grade : V-VI Emerald
Group meeting time : 3rd Break
Day : Saturday
Facilitator : Ms. Sadaf Rauf



Problem Identification

Tools:
Brainstorming
Check Sheets
Survey

The United SEISO

SEISO is the third step of the 5S. It means to make everything shiny clean and ensure that every thing is returned to nearly new status.





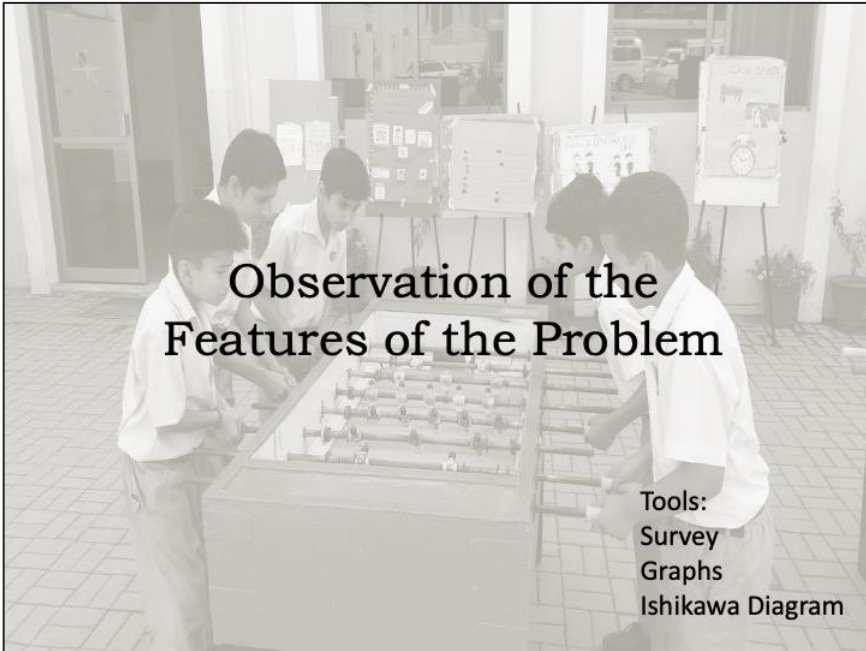
List Of Problems

Tool used : Brain storming

- Breaking Lines
- Fighting on Foosball
- Running In corridors
- Throwing Rubbish
- Vandalism (Lines on Walls & Table
- Shouting

Distribution of Problems

- Breaking Lines ----- Abdullah
- Shouting ----- Ahmed
- Running In Cooridors ----- Alman
- Throwing Rubbish ----- Arqam
- Fighting on foosball ----- Haider
- Vandalism (lines on walls & tables) ----- Zemad



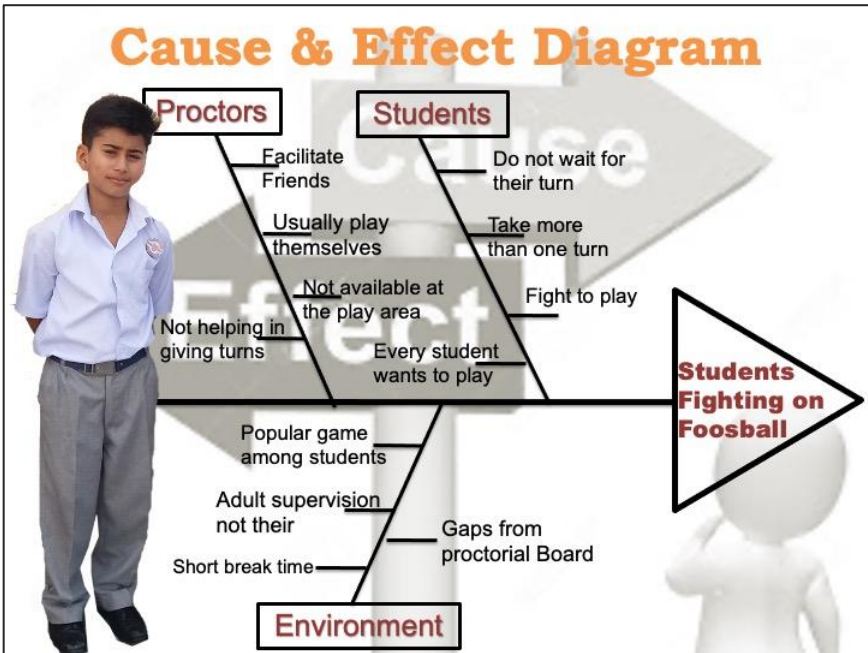
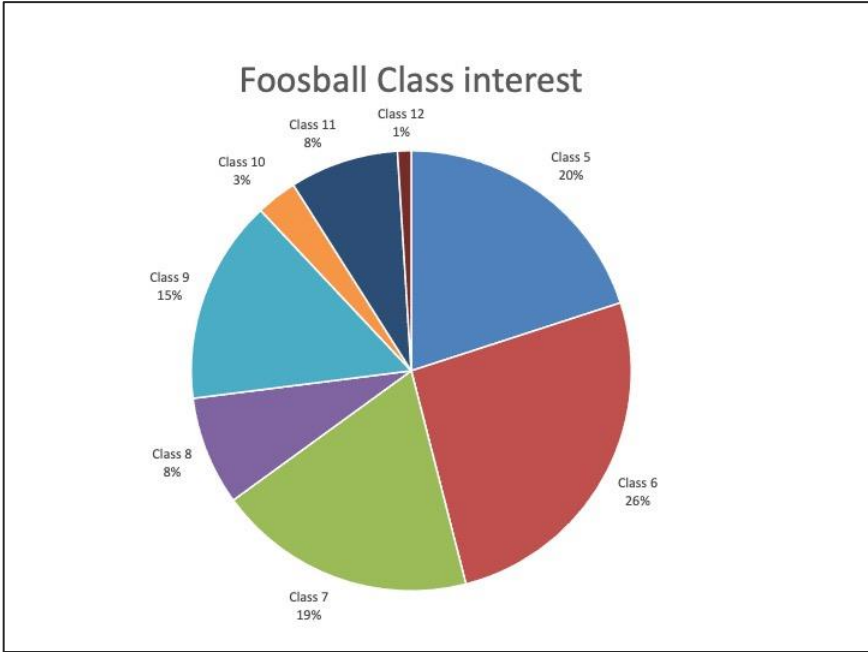
Problem Selected

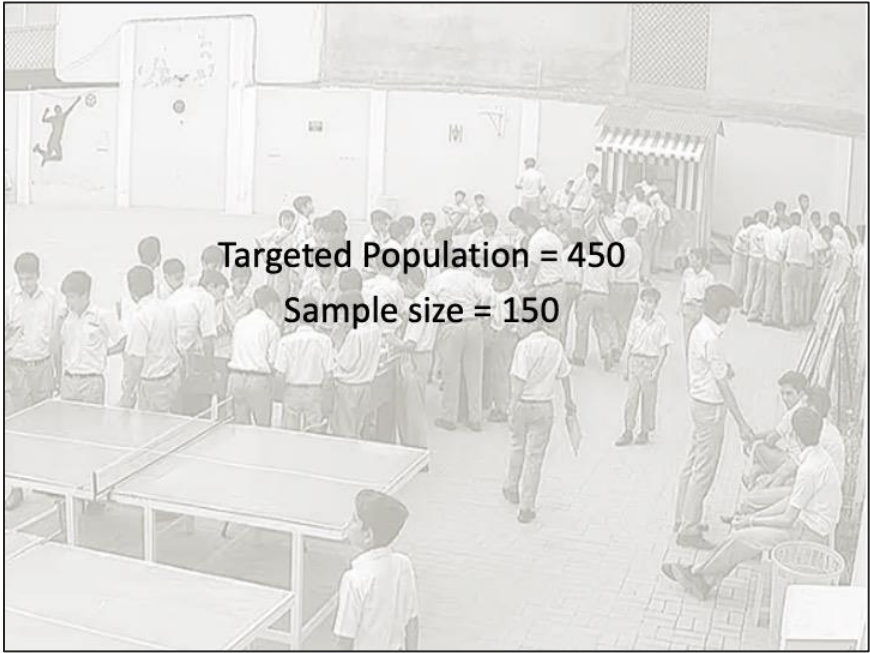
Fighting on Foosball

Students face problems at Foosball during break time, that leads to serious disciplinary issues at School.

Current Senario

- Short break time
- Miss the game
- Fight to play
- Not wait for their turn
- Every one wants to play





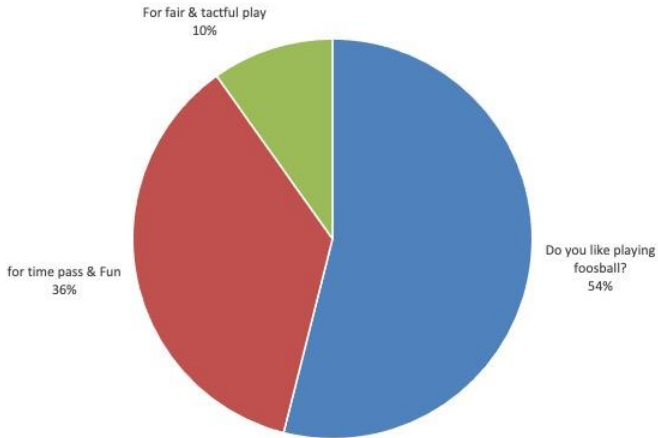
Analysis for Problem Solving 5Ws & 1H Matrix

5Ws	What	To reduce the disciplinary problems
	Why	To bring harmony among students
	Who	Students of grade V & VI (The United SEISO)
	When	During break time
	Where	Modernage, Abbottabad.
1H	How	Develop a system using observation and check sheet tools. Smoothen the process using Quantitative tools. creating a team environment through strategy.

Data Collection Survey through Questionnaire

Is foosball fun?	Does foosball increase your physical ability?
Do you like playing foosball?	For time pass
Do students play for more than one turn on the same day?	For fair & tactful playing
Do you play on your turn?	For fun
Do proctor/supervisor help in giving turns to students?	They don't get their turn
Do proctor/supervisor play themselves instead of letting others play?	There is no Proctor/supervisor on duty
Do proctor/supervisor give turns only to their friends?	They don't know how to play
Does foosball bring out competitive spirit in you?	

Interest in Foosball



Analysis of the Causes of the Problem

Analyze

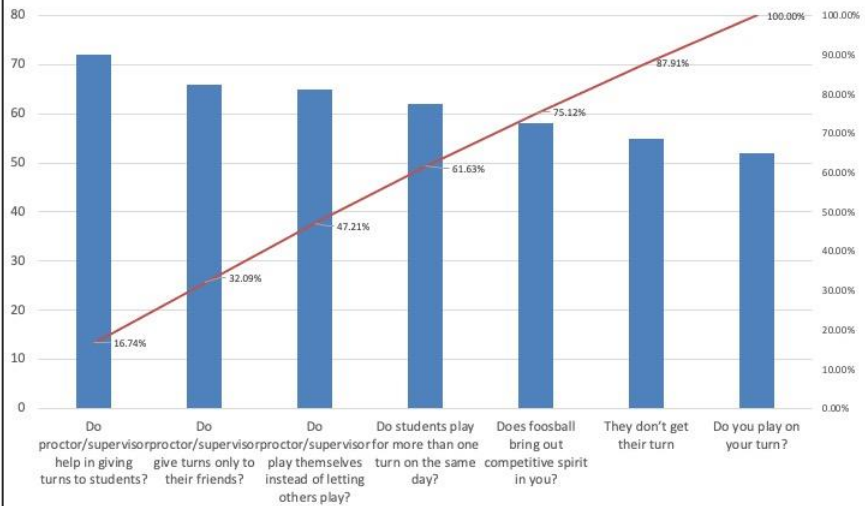
Tools:
Questionnaires
Bar Charts
Pie Charts
Pareto Charts

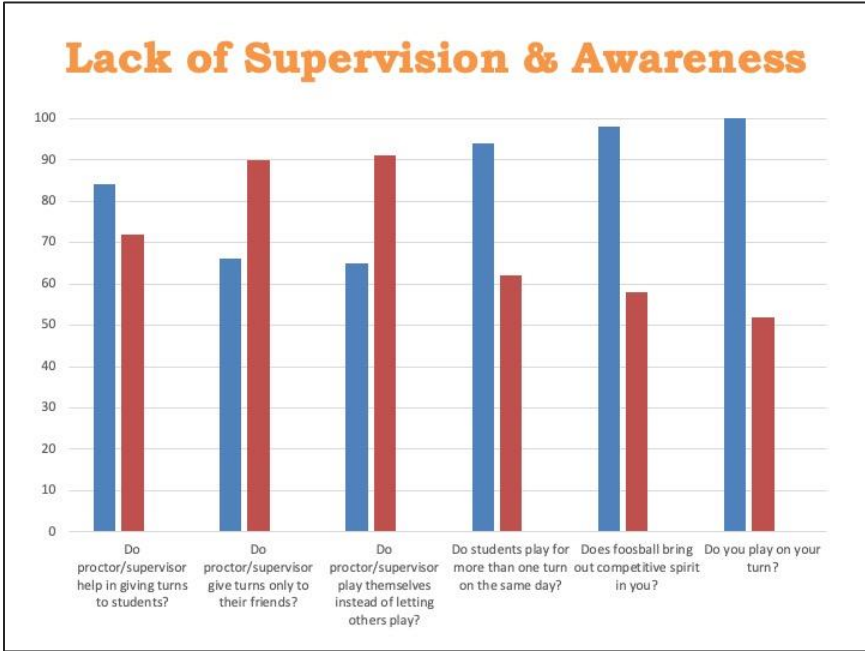
Questionnaire Survey & Assessment

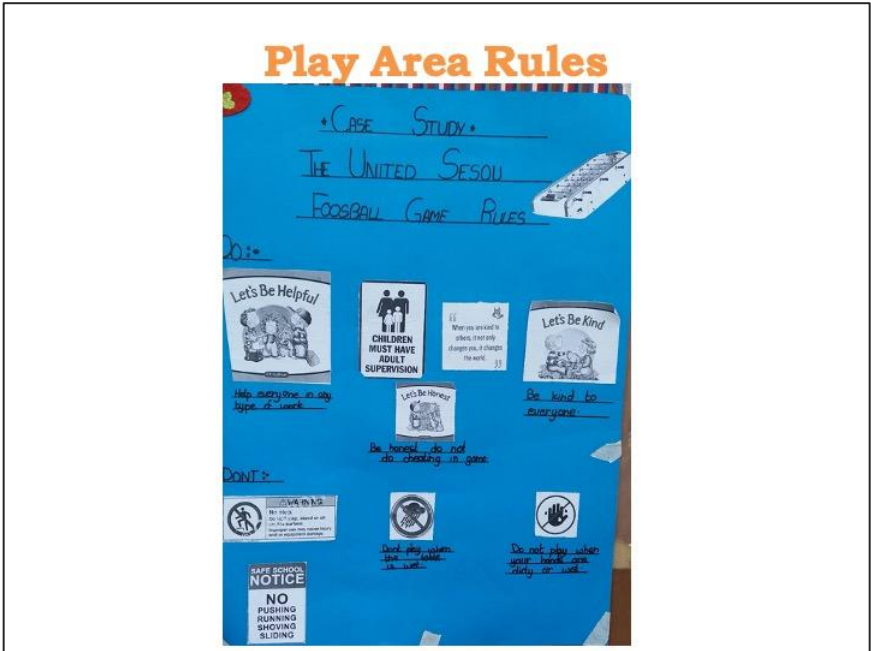


Pareto Analysis

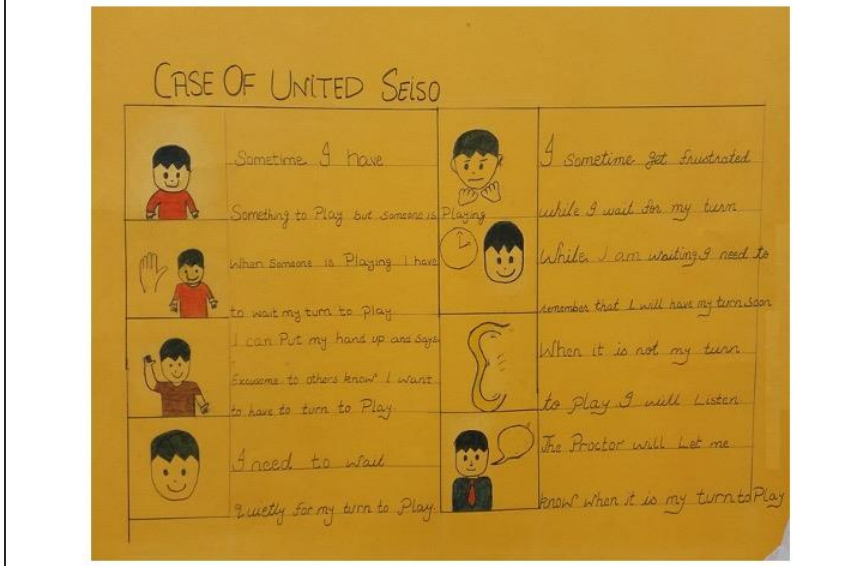
Foosball







Awareness of Students Attributes



Policy

Step 1

- Rules & Regulation for the play area
- Awareness to students
- Ensure the proctor/supervisor presence
- Each Game of three goals and Winner to stay.

Step 2

- If students do not follow the rules for the play area the game will be stop for the particular time of break.

Step 3

- If still the students not follow or misbehave then PTI may give them the punishment.

Awareness to stand in line

Remember,
everybody
cannot be served
at the same time.



Stand in line and
wait for your turn.

Awareness at class level



Awareness to wait for their turn



Awareness to maintain Discipline



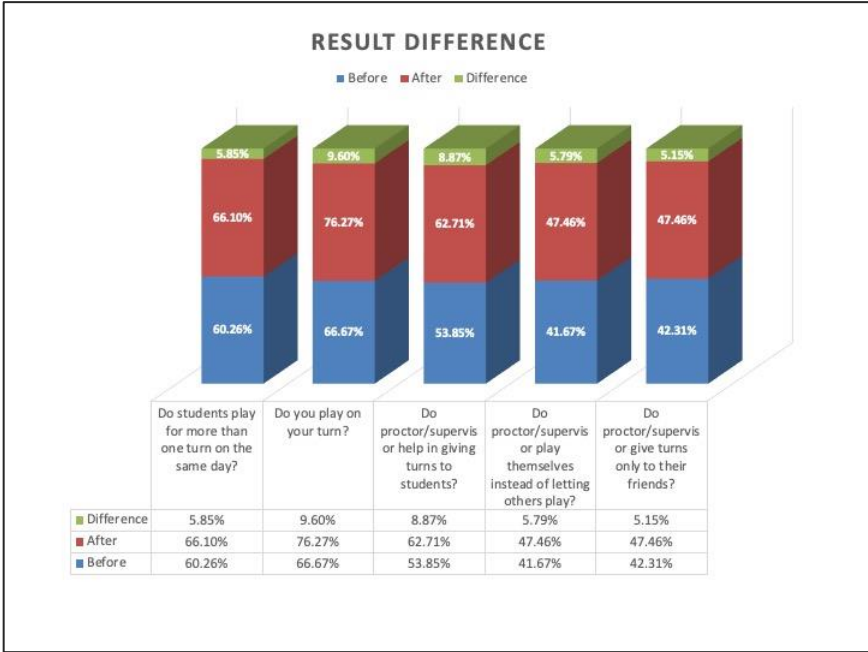
Meeting with PTI's/Proctors



Observing the Policy









Learning During Case Study

- How to deal with problem or conflict
- How to bring harmony among students
- How to make a plan
- How to make solutions to solve the problem
- Statistical tools like Ishikawa diagram, Pareto analysis, Bar & Pie Charts
- How to record minutes of the meeting.

Thank you



Annex B

Sample Presentation of Quality Control Circle (QCC)
Used in Companies for Comparison with SQCs

Courtesy

Indus Motors, Karachi
(Toyota Car Manufacturing Plant)

1 .Introduction

Circle Name	Strategic Partners	
Circle Information		
Formation Year	2012 ~ 2013	
Department	Section / Area	Group
HR	Industrial Relation	G
Caretaker / Manager	Advisor / Asst. Manager	Assistant Advisor / GL
M. Asadullah	Amir Jamal	Ammad Saleem



Circle Leader
Faizan Ahmed

Theme Leader
Faizan Ahmed

Sub Leader

Sarmad Shah

Agha Abbas

Asif Kamran

Sub Leader

Ammar Ali

Mohsin Haq

Imran Karim

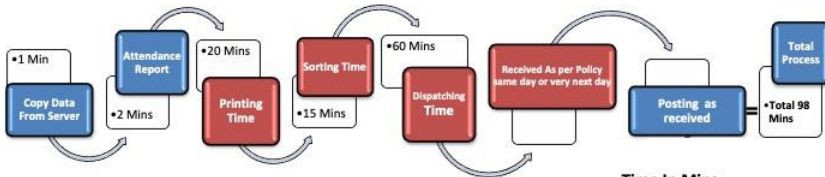
Theme	<p>.....</p> <p>Reduce Muda in Verification of Daily Attendance</p> <p>.....</p>
--------------	---



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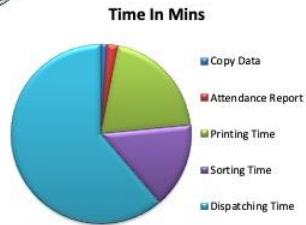
5 .Current Analysis

Process Flow of Concern Area



Total Time = 98 Mins

We repeat this process 4 times a day which is for shift A,B,G and overtime so total time consumed = **98 * 4 = 392 Mins per day (6.5 Hrs)**

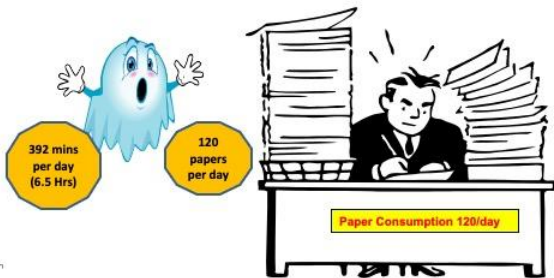
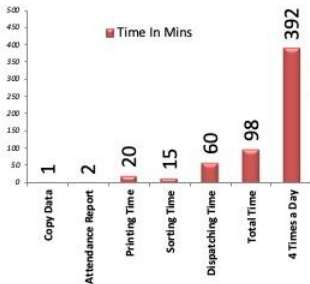


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4 (b) .Reason for Theme Selection

SAFETY	
QUALITY	
PRODUCTIVITY	↕
COST	
HR & D	

Reason for theme selection is to improve our productivity by reducing time (392 Min / 6.5 Hrs per day) and paper work.



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4 .Theme Selection

S.NO	Proposed Themes	Theme selection criteria					Evaluation (Total Marks)
		Specific	Measurable	Achievable	Relevant	Time bond	
1	Attendance Verification	◎	◎	○	◎	◎	14
2	Uploading Of Leave without Pay Status	△	◎	○	○	◎	11
3	IMC Leave Application System	○	○	△	◎	○	10
4							
5							

1 Pts


△

2 Pts

○

3 Pts

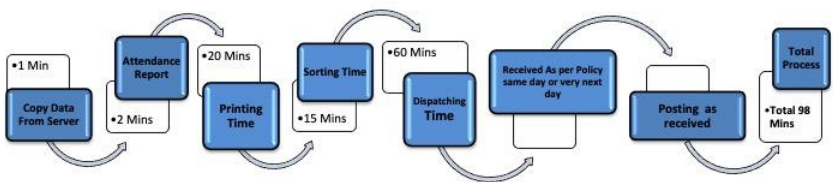
◎



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3 .Process Overview

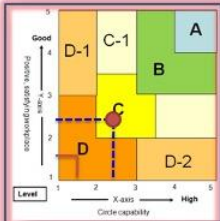
Shop Information	
Total no of Circles	1
Current Circle Location	IR



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2 .Circle Overview

X-Axis Rating Circle Capability				
Item	Details	Current	Target	Action Plan
a	Basic concept and problem solving steps	1	2	Training
b	Circle activities management procedure	2	3	
c	QC Tool application and activity result and presentation	2	3	Training
d	Development of specialized and multi skills	1	2	
e	Kaizen skill and capability	1	2	Training
Average score		1.2	2.2	



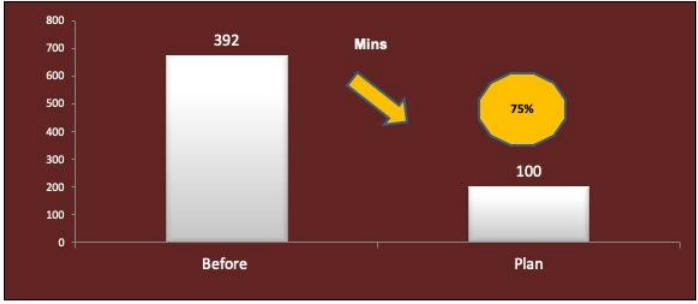
QCC Global Zone Criteria

Y-Axis Rating Positive, satisfying workplace				
Item	Details	Current	Target	Action Plan
a	Human relation and teamwork	2	2	Training
b	QC Circle meetings	1	3	
c	Collaboration with supervisor, Staff, Division	1	2	Training
d	Atmosphere to improve oneself (QC skill)	2	3	
e	5S and rules	2	2	Training
Average score		1.2	2.2	

Zone Details	Last Year	Current Year 2012 ~ 2013
Before Kaizen	-	D
Targeted	-	C
Finalized	-	

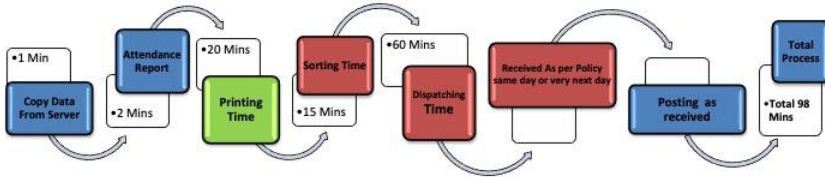
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6 .Target Setting



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5 (b) .Current Analysis (Counter Measure # 2 Free Software)

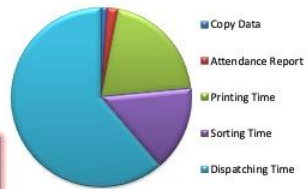


So, we plan to reduce 4 jobs but we did only 1 job

- a) Save paper 120 Daily.
- b) Time Saving 80 mins.

Only 20% of the job was eliminated.

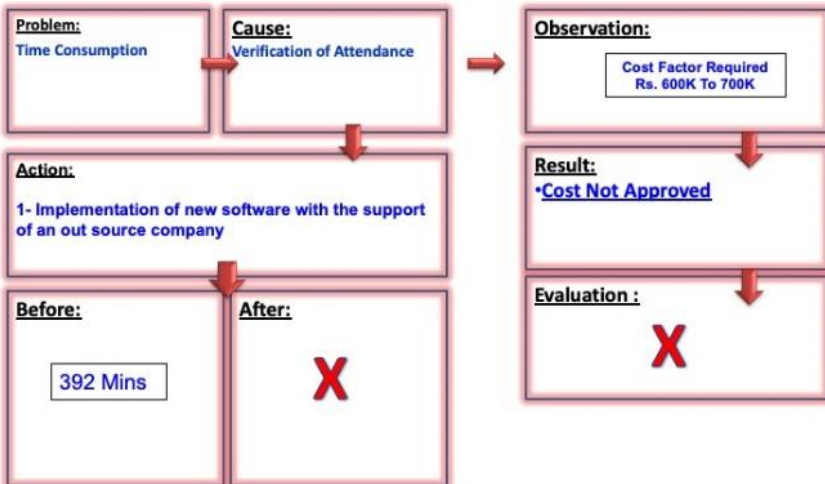
Time In Mins



Point of Concern	Extracting PDF and sending email one by one (Additional Job)
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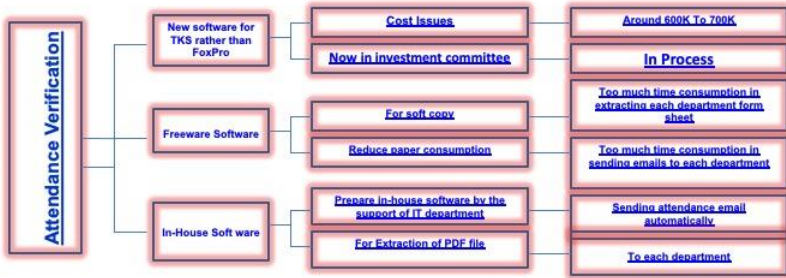
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9 (b-1) .Countermeasure Implementation



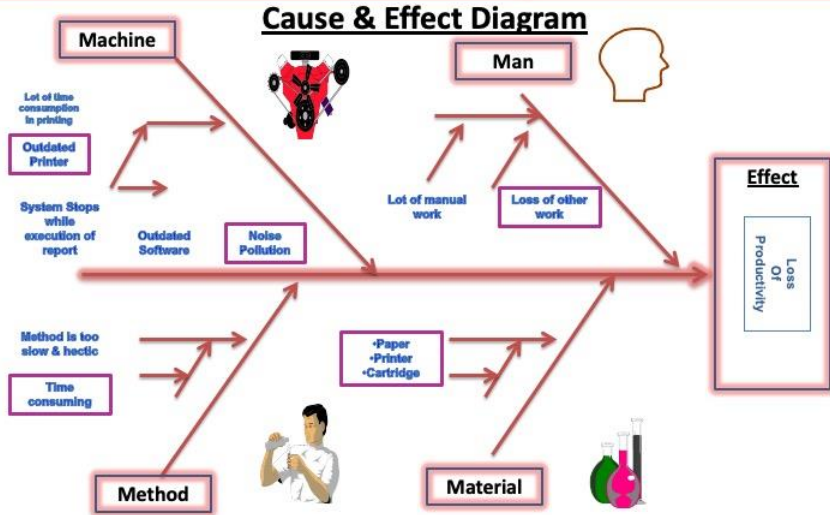
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9 .Countermeasure Planning



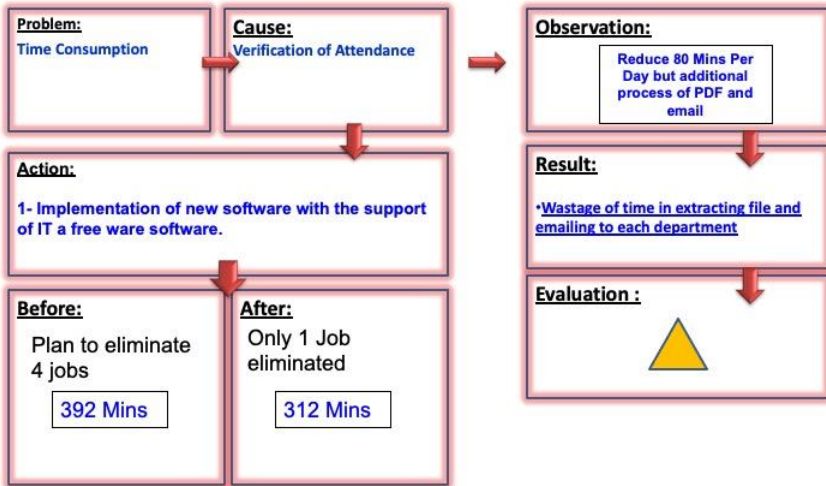
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8 .Cause Analysis



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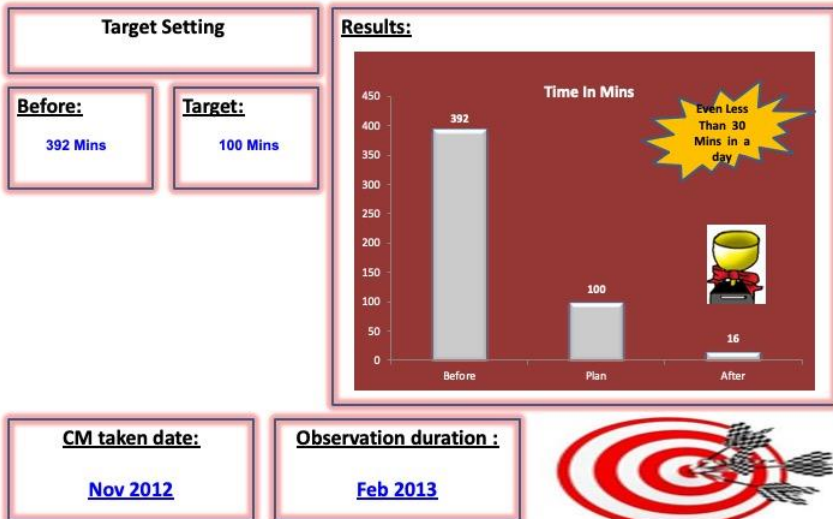
9 (b-2) .Countermeasure Implementation



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10 .Result Confirmation



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9 (c) .Countermeasures Summary

Problem	Cause	Action	Observation	Result	Evaluation
Muda in Verification of Daily Attendance	100% manual activities	Developing In house program	MUDA Eliminated	Saving Time Paper	
Muda in Verification of Daily Attendance	100% manual activities	New software (Outsourced)	Presented In Investment Committee	Project not approved	
Muda in Verification of Daily Attendance	100% manual activities	Use freeware software	Additional Muda	20% Time saved	

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11 .Standardization

What	Who	Where	When	Why	How
Step To Be Standardized	Concern Person/Section	Location Where You Did This	Mention Date/Month	Purpose Of Activity (Time /Cost Saving etc)	What You Done
Attendance Verification	HR & IT	IMC	Feb 2013	Save time , cost & Increase Productivity	In house developed software



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10 (b) .Achievements

Tangible:

Particulars	Cost
Papers	120/day means 34560/year = 23925 PKR
Printer	60000 - 70000 PKR
Cartridge	7000 * 8 = 56,000 PKR
Total Cost Per Year	149,925 PKR
Save Time	392 Mins per day

Intangible:
 Efforts by feeling and pressure of work, awareness, team work, task identity
 and task significance

Learning Points:
 Implementation of technology reduce efforts
 Only change remains constant
 Team work is the most easy way to do any work



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12 (b) .Theme Review / Future Plan

Activity Summary

Theme Duration	Meetings / Month	Total Meetings	Length of Meeting	Participation Rate
3 Months	4	14	15 – 20 Mins	85 %

Future Plan

<p>Next Theme</p> <ul style="list-style-type: none"> •IMC Leave application • Automation Posting 	<p>5 Major Mission</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="font-size: small;">Safety</td> <td style="font-size: small;">Quality</td> <td style="font-size: small;">Prod. ✓</td> </tr> <tr> <td style="font-size: small;">Cost</td> <td style="font-size: small;">HR & D</td> <td></td> </tr> </table>	Safety	Quality	Prod. ✓	Cost	HR & D		<p>Reason</p> <p style="text-align: center;">Time Consumption</p>	<p>Theme Leader</p> <p style="text-align: center;">Faizan Ahmed</p>
Safety	Quality	Prod. ✓							
Cost	HR & D								

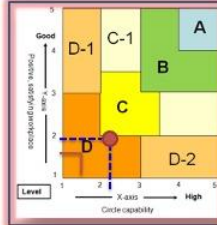
Caretaker Comments:
 By maintaining and bringing improvement in system the focus will be more on serving customers. This will enhance customer / employee satisfactions and concentrate more on their organization responsibilities and give maximum value adding output.



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12. Reflection

X-Axis Rating Circle Capability				
Item	Details	Current	Target	Action Plan
a	Basic concept and problem solving steps	1	1	Training
b	Circle activities management procedure	2	2	
c	QC Tool application and activity result and presentation	2	2	Training
d	Development of specialized and multi skills	1	1	
e	Kaizen skill and capability	1	1.2	Training
Average score		1.2	1.4	



QCC Global
Criteria

Y-Axis Rating Positive, satisfying workplace				
Item	Details	Current	Target	Action Plan
a	Human relation and teamwork	2	2	Training
b	QC Circle meetings	1	1	
c	Collaboration with supervisor, staff, Devisoin	1	1	Training
d	Atmosphere to improve oneself (QC skill)	2	2	
e	5S and rules	2	2.2	Training
Average score		1.2	1.4	

Zone Details	Last Year	Current Year 2012 ~ 2013
Before Kaizen	X	D zone
Targeted	X	C zone
Finalized	X	D zone

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STUDENTS QUALITY CIRCLES

Towards Building a Total Quality Society

ABOUT THIS BOOK

Students Quality Circles or SQCs in short, are basically miniature level activities of what the Japanese Quality Control Circles (QCCs) are in the corporate world. These activities prepare students for the Quality mindset from the very early age, thus engraving their personalities with Quality. SQC is an innovative concept and practice used as a part of schools' or colleges' co-curricular activities since mid-nineties in many countries of Asian sub-continent. The objective of SQCs program is to develop and prepare students for the corporate world as well as for a quality living in the society. The book includes a survey of sixteen schools in an Asian country and analyzes the origin of this concept and the differences in the practices of QCCs in the corporate world versus SQCs in the schools. It discusses how effectively students are practicing SQCs and how effectively they are implemented and managed by schools and colleges. Critical success and failure factors of this program are identified and highlighted. The book provides practical guidelines to educationists and management of schools, colleges and universities who want to initiate or improve their existing program.

ABOUT AUTHORS

Dr. Kamran Moosa is the Chief Executive of PIQC Institute of Quality, Pakistan. He is a member of International Academy for Quality and Quality in Education Think Tank (QiETT). He is the recipient of Ishikawa-Kano Silver Medal of 2020 by Asian Network for Quality (ANQ). He was the founding Chairman of Quality & Productivity Society of Pakistan and a senior member of American Society for Quality (ASQ). He is an author of four books on Quality Management.

Abdul Wahid Mir is the Principal of Modernage Public School and College - Abbottabad and Director General of EQUIP - Pakistan, which is a non-profit organization for promoting Students Quality Circles in the country. He is an educationist and also involved in teachers training and development programs.