

Frequently Asked Questions (FAQs) on Students' Quality Circles (SQC)

Adopt SQC as one of child friendly edifying approaches to enrich values and skills of students

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Quality Circles in Education for Students Personality Development

In Nepal, Students' Quality Circles (Popularly known as SQC) was initiated in 1999 from Himalaya Vidya Mandir, Kathmandu. Till now, more than 7,000 Nepalese students feel proud to be a member of SQC by learning tools and techniques of quality circles for problem solving, practicing the SQC projects at their respective schools and getting benefits of transforming themselves with value added life skills.

There are 64 SQC Master Trainers (MTs) working voluntarily for preparing hundreds of SQC facilitators throughout the country. An institution named QUEST-Nepal is promoting SQC in Nepal for making every child a total quality person having good and smart personality.

In July 2011, a dozen of experienced master trainers had half day constructive dialogue among them in Kathmandu and came out with 20 queries on SQC which they termed as frequently asked questions (FAQs) that need clarifications to SQC practitioners. I am trying to provide answers to the following FAQs on SQC which may be helpful to other SQC practitioners, too.

1. Are there any relationship of Students' Quality Circle (SQC) with Total Quality Management (TQM) and Appreciative Inquiry (AI)?

SQC has strong relationship with TQM as well as AI. **Students' Quality Circle** is defined as a small team of voluntary students at the same educational level who meets regularly in study place to identify, analyze and solve their recurring problems for developing their quality mindset with good and smart personality. Dr. Jagdish Gandhi has experimented SQC in his City Montessori School, Lucknow, India. **Total Quality Management** is defined as a systematic, scientific and institution-wide activity to solve recurring problems for continuously delighting customers through its products and services. Dr. Edward Deming has first introduced the concept of 14 point principles which has been practiced in Japan and which ultimately turned out as TQM philosophy. **Appreciative Inquiry** is defined as an institutional development method that engages all levels of an institution including customers and suppliers for renewing, changing and improving the performance of the institution. This famous Organizational Development AI method is conceptualized and promoted by Dr. David Cooperrider.

TQM and **AI** are both universally recognized organizational development methods for improving performance of institutions and are applicable in all sectors including manufacturing, health service, hospitality, educational, trading, and others. On the other hand, **SQC** is an innovative teaching method for shaping the behaviours of young children to make them total quality person. Thus, the purpose and areas of application of both TQM and AI are similar whereas, SQC has fundamental difference with TQM and AI in its purpose and area of application.

However, the approach of TQM and the approach of AI are quite different for improving performance of an organization. TQM believes that there are problems in the organization and there is scope of solving problem with everyone's effort. Thus, TQM is said to be using "deficiency model". On the other hand, AI believes that there are positive strengths in each individual and organization, and this positivity can be enhanced to improve performance of the organization. Thus, AI is said to be using "asset-based model".

The approach of Students' Quality Circle (SQC) of solving problem is similar to the approach of TQM. The approach is different with AI. Thus, it can be said that SQC is a sub-component of TQM in education, involving Students with a secondary purpose of problem solving and primary purpose of personality development. SQC has positive relationship with TQM and negative relationship with AI. SQC and TQM helps to develop collaboration where as AI motivates individuals to develop institution.

2. How to distinguish the terminologies like quality of a product, quality of a service and quality of a human being?

First we should understand the terminology -"QUALITY". The definition of QUALITY is as simple as this: **Having characteristics that delight its users- now and always in future.** Thus, the product will be said to have its quality if its consumers and customers feel happy after using it. The service will be said to have quality if the users of the service feels full satisfaction and be happy. Similarly, a person as a human being is said to have its quality if the universal society which he or she he belongs to feel proud of having him or her as its citizen.

3. Have students participated in SQC projects been really turned out as total quality person?

Yes! There are many examples of SQC alumni being total quality person. We identify total quality person simply as how the person behaves socially. If the person is good for always ready to serve the society, and is smart for always trying to do scientific enquiry and not content with the present status then he or she is said to be a total quality person (TQP). SQC shapes students to have both of these characteristics during the process of SQC projects.

However, we should always be careful that students have properly processed the SQC project in a team taking systematic and scientific approach taking necessary time with dedication and commitment, and not just preparing for the presentation at the national and international conferences. The presentation preparation is just a byproduct work of case study as motivation to students. Actual process of SQC case study project is taking appropriate time, conducting round robin brainstorming, analyzing with facts and figures and solving by taking appropriate countermeasures. The group of students completing one SQC project should not stop working, but take up another important problem to solve. After completing three or four projects we will find students of the team develop good and smart characters to become a total quality person.

4. Can we utilize the outputs of SQC projects practically in real life?

Oh sure! We need to know how to utilize the valuable output of SQC project.

Instead of replicating the outcome of any SQC project, it will be better if students study their problem themselves and try to find out solutions of their problem on their own environment and situation. This will help them to build their personality, which is the primary purpose of having SQC project in any educational institution.

However, a particular SQC team should not stop the SQC project immediately after the problem is solved. The process of SQC advises us that after the problem is solved the SQC team must monitor for certain period and see whether the problem is solved permanently or not. If the problem reappeared again the SQC team should reassess the root causes and implementation of countermeasures and continue till the problem is solved permanently. If the problem is solved permanently then the SQC team should standardize it by making a manual by including the characteristics of problem, its root causes and the implementation plan of countermeasures, and train all involved- all other students, staffs, teachers and managers of the educational institute.

5. How all students in a classroom can be motivated to participate in SQC projects?

It is Simple. Students can be motivated by demonstrating how a particular SQC team is approaching the problem and how they are solving them. Ask SQC team to present their findings in the class from time to time. After one project is finished and presented, it is certain that other students slowly move forward to participate in the SQC case study project and form a team to solve their particular problem to develop their personality.

Moreover, the educational institution which wants all student of a particular class be involved in the SQC project should allot one hour lecture session per week to SQC for all students to participate in the SQC project on a regular basis, as a co-curricular subject. SQC team must work within the scheduled class session and should not feel as an overload by any student.

6. Is it necessary that SQC projects are introduced to all students in a school?

Yes! If we want all our students of our institute be total quality people then we need to motivate all our students to participate in students' quality circle projects. It is a must.

This is what happened with the case of Quality Control Circles (QCC) first introduced in industries in Japan in 1962. In initial years, there were few thousand quality circles in certain industries only. Then, slowly all workers started participating and within one decade all workers of all industries in Japan started working in quality circles in Japan. Not only that seeing its benefits many circles started forming in American, European, South East Asian countries started forming QCs in industries and now there more than billion quality circles are working in the world in industries.

Moreover, the top management, directors, principals, head teachers of school should take initiation by preparing few teachers as SQC facilitators and allot at least one period per week in class schedule for all classes of the school. Another important part is that the school should observe a SQC or Quality day annually and ask all SQC team to present their cases before all students, teachers, staffs and parents. This will motivate all students to share among themselves and also parents to pursue their students to participate in SQC projects.

7. How to introduce SQC as a co-curricular activity in all schools?

First, we have to motivate the Government officials at ministry of education, experts on school education, entrepreneurs of private educational institutions and parents or society as a whole. It is, thus, a very long process.

One institution like QUEST-Nepal in Nepal should take the lead in organizing discussion among all these stakeholders showing them evidence of personality improvement and convincing them to incorporate SQC as co-curricular activity in school education. Conferences, seminars, workshops, discussion forum, media mobilization, publication, etc. are few activities for convincing these stakeholders importance of SQC as co-curricular activity in school education.

Another approach is the Applied Research or, "convincing by examples" should also be conducted side by side to convince all stakeholders of education sector. The responsible institution like QUEST-Nepal should take the lead in selecting few districts and conduct the applied research taking development agencies' support.

8. How much theoretical knowledge should be given to students to work on SQC projects?

First, Students must learn four approaches of SQC. They are Kaizen mindset, Plan-Do-Check-Act wheel, team work and brainstorming. All students involved in SQC project should be trained on these approaches of SQC.

Secondly, they should learn the systematic problem solving process, which is very important. They should digest it wholeheartedly. Students should be trained on the steps and reminded strictly that they should follow the stepwise procedure properly and cannot jump fast to solve the problem.

Lastly, students must learn all seven basic tools in the initial stage of SQC learning. They should be trained how to collect data in the easier and efficient way using check-sheet. They should be trained how root causes are identified using various tools like cause and effect diagram, scatter diagram, histogram and Pareto diagram. After few SQC projects students can learn other advanced tools for problem identification, analysis and solution.

Students should be told in brief about the history of SQC and its purpose, too.

9. How to provide updated knowledge on SQC to students?

As other subjects of learning, SQC is also not a static concept. Knowledge on SQC is ever growing and we need to update our knowledge and train students with new updated concepts and working tools of SQC. SQC is relatively new concept and it has borrowed tools from other subjects. Initially, it

started as a replica of Quality Control Circles practiced by workers in industries. Thus, naturally it borrowed tools from industrial quality control circles. When SQC shifted its priority on its purpose from solving problems of schools to developing personality of students, doctrine is changing very fast. Instead of calling Students' Quality Control Circles, educationists are calling it Students' Quality Circle. People are taking it as a tool of personality development and are even thinking of keeping it as co-curricular subject to all students. We have to keep track all these changes for betterment and go on updating the knowledge on SQC to share with the students involved in SQC.

Presently, SQC is considered as a multidimensional subject incorporating the dimensions of quality management, educational leadership, children psychology, personality theories, quantitative and qualitative research methods, inter and intrapersonal communications and information and communication technology. Facilitators must search as well as research available knowledge on these subjects; amalgamate them to update continuously the concept, approach, techniques and tools on SQC for motivating and training the SQC students.

QUEST-Nepal has initiated to conduct Master Trainers Laboratory for this purpose of updating knowledge from 2010 and need to continue to come out with new ideas for betterment.

10. How can we monitor that the problems identified, analyzed and solved by students through SQC projects are permanently disappeared?

It is advised that School in general and facilitators in particular must keep track of all SQC projects operating at schools. Unique ID no. should be given to each SQC project and record of all SQC projects should be kept by schools.

We know that the problems solved by the SQC project have secondary importance and the most important purpose of SQC project is to develop the personality of students involved on it. However, the record of problems and case study report should be kept at schools and monitored whether the problems solved by the particular SQC team is permanently solved or not by the particular facilitator using the Control Chart prepared by the team. The record should be used for motivating other teams and to make the show case for others to learn.

11. How the results of SQC projects are monitored in Control chart?

Quality Control chart which is said as the first quality control tool based on sampling statistics was described initially by Dr. Walter Shewhart and is most widely used by quality control professionals for monitoring the process and product quality.

SQC has borrowed this tool from industry and is used for monitoring the results of the SQC project. SQC project always starts with identifying problem and setting target of improvement. It is always necessary to quantify the target. After the completion of SQC project, a control chart is prepared with time as X-axis and maximum and minimum limits in Y-axis keeping targeted point in-between these control points. The result is measured and plotted on the control point periodically to see whether the result is within the limit or out of it. If it is out of the limits, it depicts that there is some problem in the process of problem solving and so students in SQC must revisit the countermeasure plan. If the results are coming within the limit for a long period, then it depicts the success of the SQC project. The Control Chart is a very strong tool to decide whether the SQC project is complete or needs further processing. This tool is used in the "C-check" step of P-D-C-A cycle.

12. How to set control limits for monitoring the status of the problems solved by students through SQC projects?

Control limits (maximum and minimum limits) in Control Chart depend on the working environment and operators habits. Setting of the control limits to monitor the results of SQC project depends on not only the students who are working in the project but also on other students, school environment, teachers, staffs and manager of the school.

There are two causes of process variance - Assignable cause and Chance cause. Assignable causes are those which are controllable and the SQC team must try to control these and Chance causes are those which are beyond the SQC team to control. Control limits in the control chart depict the

variance for chance causes, and so the SQC team should be careful for identifying the control limits which depict the variance of the project output target due to chance. Control limits can be squeezed or narrow down after observation of the output of the SQC project.

Control limits are thus standardized in the first phase by studying the assignable and chance causes and SQC team should try to narrow down as the assignable causes are rectified.

13. How to minimize and simplify the application of QC tools in SQC projects?

Don't try to minimize the application of QC tools. And, don't overuse them too. Just use the appropriate tools at appropriate places. Don't use redundant tools. Don't try to use many tools for the same purpose. First, identify the purpose of using tools in the process and apply the appropriate tools.

Basic QC tools are simple easy tools based on the strong statistical background. Learn more advanced tools too and apply as your practice on SQC project deepens.

14. What is the stepwise procedure of problem solving in SQC project?

This is often referred as **the QC Story** by the Japanese. It is so called because while presenting the SQC project as a case study after its completion, it reads or listens like someone telling a story that the team had a problem and how they solved their problem. The seven steps are very popular for identifying, analyzing and solving the problem. The seven steps of systematic way of problem solving in SQC are-

Step 1: Select topic within the problem

Step 2: Set target for result after problem solving

Step 3: Plan activities for cause analysis, and countermeasures implementation and checking

Step 4: Analyze root causes of the problem

Step 5: Implement countermeasures

Step 6: Check results

Step 7: Standardize control

15. How to select the right tools and techniques at appropriate problem solving process of SQC project?

It is the purpose that decides which tools to be used. The tools should be efficient, simple and readily verifiable.

For examples- for data collection use check sheet. For determining the nature and variance of data, use Histogram. For prioritization use Pareto Chart. For cause analysis use Ishikawa diagram. For identifying correlation between two variables use Scatter Diagram. For monitoring the result on time basis use Control Chart. The following reference table may help to select the appropriate basic QC tools in each steps of problem solving.

	Check sheet	Graphs/ Chart	Pareto analysis	Ishikawa diagram	Histogram	Control chart	Scatter diagram
Select topic	#####		#####				
Set target		#####			#####		
Plan activities		#####					
Analyze root causes				#####	#####		#####
Implement countermeasures		#####		#####			
Check results					#####	#####	
Standardize control		#####			#####	#####	

The table above is only for reference. SQC team may also use advanced QC tools like affinity diagram and relationship diagram to cluster ideas generated from many sources and analyze to identify

complicated root causes. Besides there are many other tools, which the SQC team can search and use it for the purpose of problem solving.

16. How to distinguish causes, major causes and root causes of a problem?

The symptom of a problem is most of the times visible, but problem itself may not be visible and even may be difficult to describe for many people. Sometimes we may be confused with the words like symptom of a problem and problem itself.

Causes are the reasons for any problem. We have many reasons or causes for a particular problem.

This way of asking why several times in cause and effect analysis and digging out deeper and deeper into the reasons or causes determines the problem hierarchy. Logically and rationally digging out reasons of problems generates many **causes** in hierarchical order. The causes may be hundreds or thousands if the problem is very complicated and if they are analyzed properly.

Major causes are those causes which are among all these explored causes but which have major impact on the problems we are studying. After analyzing properly, we may pinpoint few major causes among these causes in problem hierarchy.

Root causes again are those few causes which are among all these major causes which may not be practically and theoretically feasible to explore more down on the problem hierarchy by asking why questions. Once we identified root causes, we may stop analyzing further deep to find out causes of that root causes.

SQC project always analyze hierarchical problems to find out first the symptom, then many hierarchical problems and their respective causes, then identify major causes. In the end, once root causes are properly identified, countermeasures are designed to address these root causes which will eradicate the problem permanently. It believes that unless we identify root causes and counteract on it, the problem cannot be solved permanently.

17. Where to use Pareto analysis- in problem prioritization or cause prioritization?

The purpose of Pareto analysis is to prioritize variables. Pareto analysis may be done for prioritization of problem as well as prioritization of causes.

18. What is the significance of cumulative frequency line in Pareto diagram?

A Pareto diagram is a combination graph, combination of column/bar and line graph. Bar graph consists of absolute figure of the occurrence of variable (problems or causes) in primary Y-axis, and cumulative frequency line is a line graph drawn with cumulative frequency of occurring of variable (problems or causes) in secondary Y-axis.

The bar graph in Pareto diagram depicts clearly **which** are the trivial few important variables. And, the cumulative frequency line graph depicts clearly **how much** these few important variables are. Thus, only drawing bar graph in Pareto diagram, we may identify and show the variables of importance. But, when we add the cumulative frequency line graph, we can identify and show the magnitude of the importance of the identified variables.

The significance of cumulative frequency line in Pareto diagram is to show the magnitude of importance to prioritize the variables (problems, or causes).

19. How we use Pareto analysis for unrelated problems?

Generally, Pareto analysis is done for prioritizing among many variables which are more or less related to some specific phenomenon. The experience has shown that once the problem prioritized is solved other variables also reduced in Pareto diagram. Hence, the use of Pareto analysis is specially done with related variables only.

For unrelated problems, a strong statistic QC tool called scatter diagram is plotted in two axes to determine the nature of relationship and identify the correlation between two variables. If these two variables are found to be unrelated, then the plotted points in the scatter diagram will have no exact trend. Once, scatter diagram depicts that there is no relationship between two variables; we may discard the unrelated variable from Pareto analysis.

20. What is the significance of Scatter diagram and how to use it in SQC projects?

Scatter diagram is a point graph plotted with data of occurrences of two variables on two axes to identify the relationship between these plotted variables. This is an important tool for identifying the relationship between one specific problem with one specific cause, and also to identify the relationship between two causes of one specific problem.

- a. If the pattern of points or dots plotted on the graph has upward trend, then the variables are said to have the positive correlation depending on the trend line slope. That means if one variable increases other will also increases with the proportion of the slope.
- b. If the pattern of points or dots plotted on the graph has downward trend, then the variables are said to have negative correlation again depending on the trend line gradient. This means, if one variable increases other will decreases with the proportion of the slope.
- c. If the pattern of points or dots plotted on the graph does not show any pattern then the variables are said to have no correlation. In this situation, we cannot predict that if one variable increases, then other variable may increases, or may decreases too. It is uncertain.