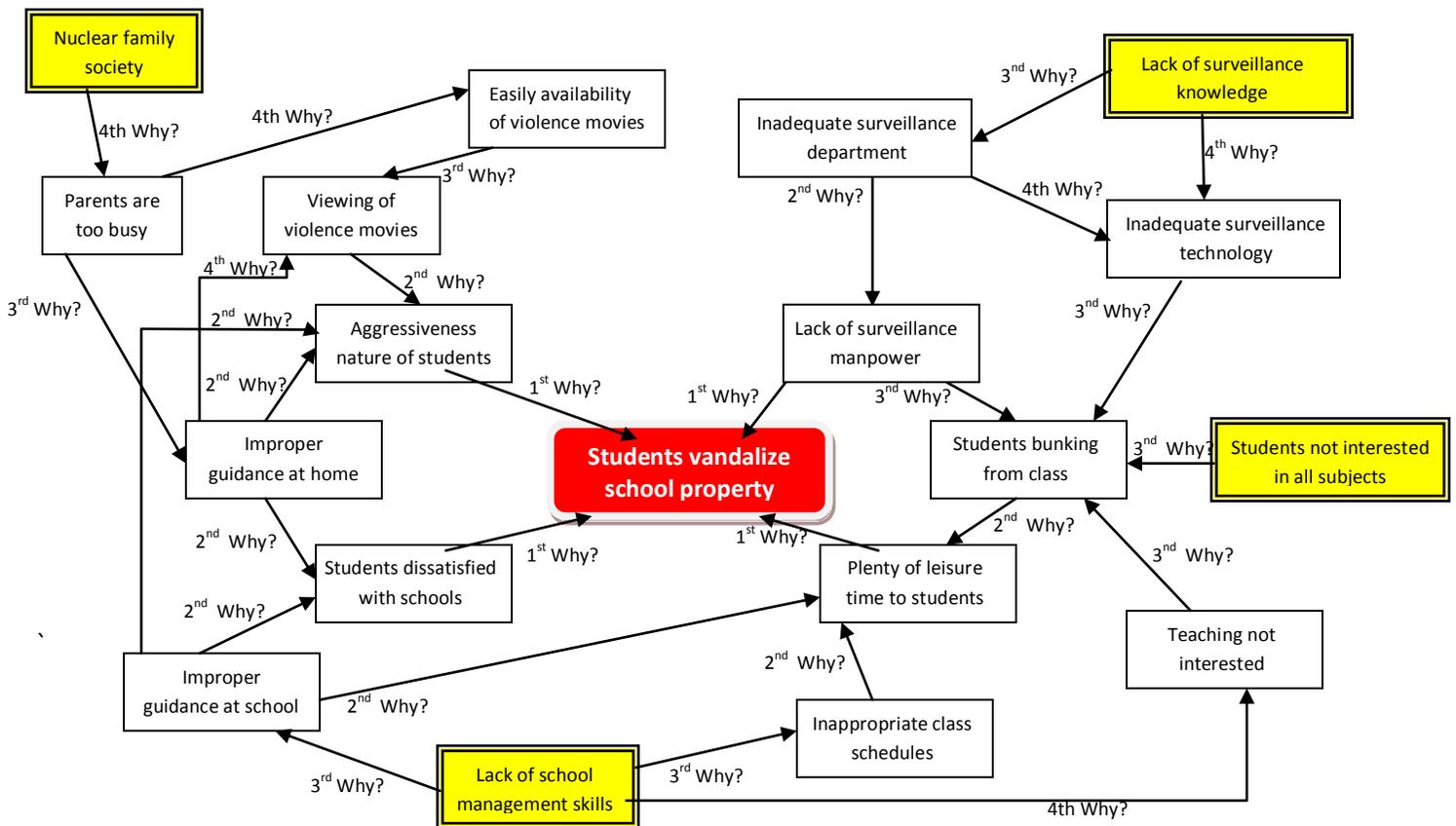


Relations Diagram:

A Simple Visual Tool for Digging out Root Causes of Problem for SQC team

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A Hypothetical Case: One Students' Quality Circle (SQC) team of a secondary school in Lalitpur wanted to solve their problem of vandalizing school property by schoolmates. The team conducted several brainstorming sessions, observed keenly the phenomenon of the problem and collected information based on facts with the help of various types of check sheets. They clearly defined the problem and wanted to know the root cause(s) of the problem to identify the countermeasures. The obvious tool they knew was logically brainstorming with Ishikawa Diagram for cause and effect analysis. After two three weeks of brainstorming, they were not happy with the results they got from the Ishikawa diagram. There were two major reasons were not satisfied- (1) the same cause was repeated several places and (2) few causes are related to each other, that is many causes were found to be the effects of other causes. They were confused for identifying the real root cause(s). One of the team members has read somewhere about the Relations Diagram to solve this type of complications. The team discussed and decided to learn more about the Relations Diagram. They drew the Relations Diagram as in the figure given below after conducting brainstorming with as much as they can by asking questions "WHYs?" after WHYs?". This helped them to detect the real root causes of the problem of vandalizing school property.



Relations Diagram: Root cause identification of vandalizing school property

The SQC team members thus, understood with the help of the Relations Diagram that there are four root causes (Yellow cards)- Nuclear family, Lack of school management skills, students not interested in all subjects, lack of surveillance knowledge for creating the problem or effect (Vandalizing school property) shown in the red card. Then, the team tried to find out among these root causes what are under their control and what are beyond their control and develop action plan to solve the problem.

Introduction: The Relations Diagram is also called Interrelationship diagram which shows cause and effect relationships. The process of creating a relations diagram helps a group to analyze the natural links between different aspects of a

complex situation. The Relations Diagram is one of the seven new QC tools suggested by the QC Head Quarter of Japanese Union of Scientists and Engineers who are the promoters of QC Circle in Japan. The American Society of Quality (ASQ) has also approved in the name of Relationship Diagram. This can be said as an advanced version of Cause and Effect Diagram. There are different variations of the Relations Diagram but the figure as shown above is the one most widely used by all QC circles.

Purpose: The purpose of the Relation Diagram is to create a visual presentation of the brainstorming exercise done to identify the causes in hierarchical orders so that the root causes can be identified. The diagram provides a clear understanding of different levels of causes of the problem by asking the same question several times “Why this is happening?”

The purpose of the Relations Diagram is to understand hierarchical links between cause-and-effect relationships thereby identify an area of greatest impact for improvement. And, particularly this tool is used when a complex issue is being analyzed for causes. After generating cause-and-effect diagram if the team found that the causes identified has interrelationship and has complexities in identifying root causes it is used to deeply explore more the relations of causes.

Construct: Materials needed- Post-its, sticky notes or cards of different colors (White, yellow and red), marking pens, large writing work surface- chart paper or flipchart pages, or even white boards will do.

1. First, write a statement defining clearly the issue that the relations diagram will explore. Write it on a red card or sticky note and paste it at the centre of the writing work surface.
2. Brainstorm among the team for generating ideas asking questions (1st Why?) “Why this is happening?” or, what may be the direct reasons for that problem happening. Discuss and identify with consensus the direct causes of the problem. Write it on white cards or sticky notes and paste them on white work surface and draw arrows pointing toward the centre card which we call it as effect card. These direct causes are also called 1st level of causes or primary causes.

[Refer four primary causes of the hypothetical case which were generated after asking 1st whys in the Relations Diagram, shown above.]

3. Now consider each of the primary causes as the problem or effect. Brainstorm among team members again by asking questions (2nd Why?) “Why this is happening?” or, what may be the direct reasons for that specific primary cause happening. Brainstorm turn by turn to each primary causes. These ideas are called the secondary causes which are generated after 2nd Whys? Write the secondary causes generated in white cards and paste near the specific primary cause. Draw arrows from the secondary cause cards as before pointing towards the respective primary cause.
4. Now consider each of the secondary causes as the problem or effect. Brainstorm among team members again by asking questions (3rd Why?) “Why this is happening?” or, what may be the direct reasons for that specific secondary cause happening. Brainstorm turn by turn to all secondary causes. Then, these ideas are called the tertiary causes which are generated after 3rd Whys? Write the tertiary causes generated in white cards and paste near the specific secondary cause. Draw arrows from the tertiary cause cards as before pointing towards the respective secondary cause.
5. Repeat brainstorm and exercise to develop Relations Diagram till the team are exhausted with the ideas to go further analysis. It is observed that one cannot go beyond 5 Whys. The root causes are there now in the Relations Diagram.
6. Observe closely all cards pasted in the Relationship Diagram. Cards with arrows flowing only away and entering not a single arrow indicate root causes. Identify such cards and replace with yellow cards copying the statement. Eliminating root causes can result in subsequent causes also being eliminated, giving a significant improvement for a relatively small effort.

The Relations Diagram of hypothetical case shown above seems complicated in the first sight. However, if the team members move slowly asking several “Whys?” from identifying primary causes and pasting those cards and again moving forward to secondary causes till they identify the root causes, it will be an exciting exercise to the team members. Students will love to use it.

There are several variations of Relations Diagram and the steps explained above are the best for students as a tool in Students’ Quality Circle exercise. Once students become expert in Cause and Effect Diagram, they need Relations Diagram further learn to identify the root causes.

Very simple isn’t it? Students! You try it next time.