Matrix Diagram

A Simple Visual Tool for Identifying Strengths of Relationship among Different Dimensions of Characteristics for Problem Solving

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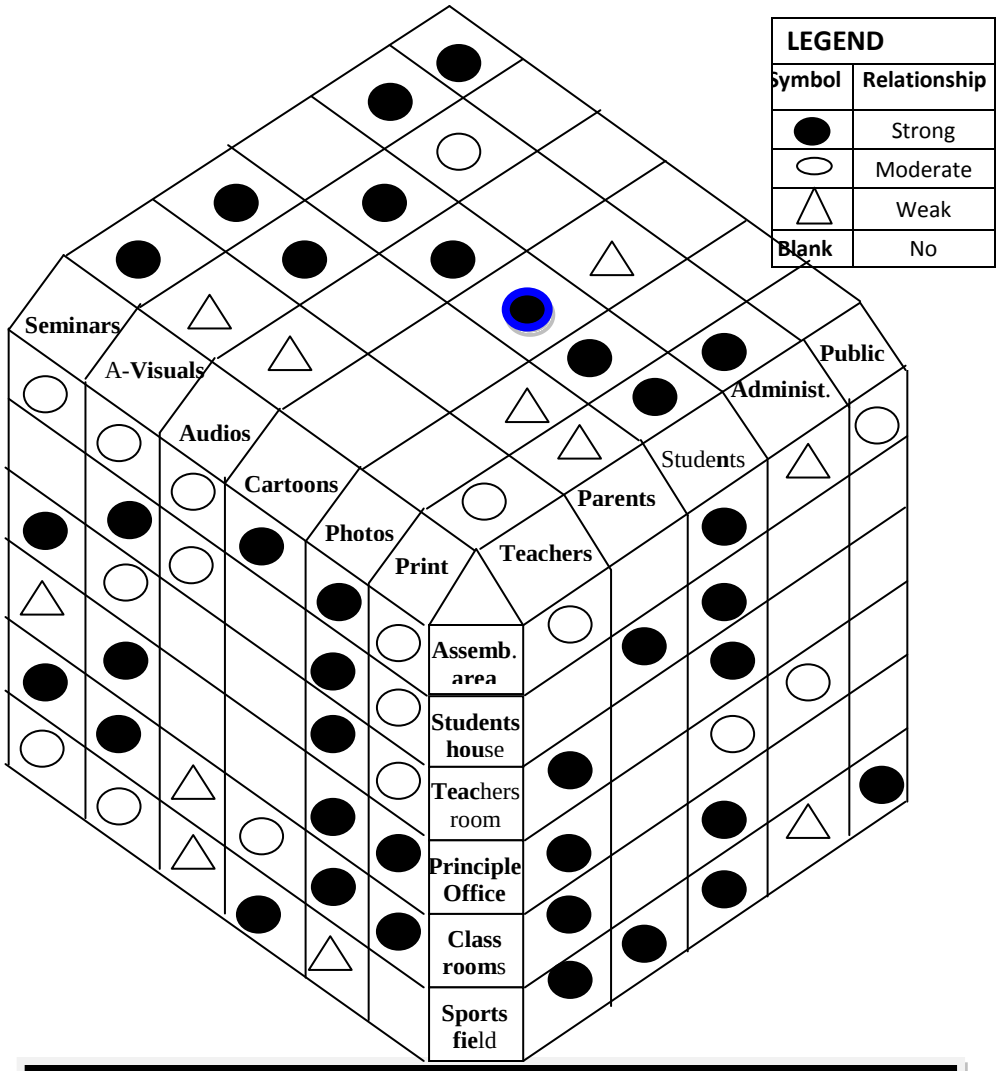
A Hypothetical Case: One Students' Quality Circle (SQC) team of a higher secondary school in Pokhara wanted to solve their problem of spreading SQC activities among all students of their school. The team conducted several brainstorming sessions, observed keenly its phenomenon and also root causes. Why 100 percent students of the school are not motivated to participate in SQC activities in spite of its several tangible and intangible benefits was the question they had on their mind. The team identified three major causes of this problem, i.e., the lack of knowledge, skills and attitudes (KSA) among all students, teachers and community in large. They thought of formulating programs which develops KSA among various stakeholders of schooling system. However, they found that to prepare an action plan which gives result in cost-effective and time-efficient manner by answering what activities they have to do, where they can perform the activities and who should be involved for different activities seems an arduous work for them. After doing some brainstorming in a systematic manner among the team members they realized that they should understand first the strengths of relationship between important variables to prepare an effective and efficient plan. They liked to focus three major variables for this job. They were (A) KSA activities, (B) School stakeholders and (C) Location and place. They could just prepare an action plan with 5 W & 1 H technique without knowing the strengths of relationship between different characteristics of these three variables. But, it was sure that the plan would not be efficient and effective one. They were looking for some QC tools which can assist them to identify the strengths of relationship between possible characteristics of three variables- activity, stakeholder and place. They learned about one tool called "Matrix Diagram", which is a simple visual tool for identifying strengths of relationship between different dimensions of characteristics for assisting to make effective and efficient action plan.

First, they brainstormed and identified different possible characteristics of these three variables. They identified six possible characteristics of the variable **'activity**' - (A.i) printing materials preparation and display, (A.ii) photographic materials preparation and display, (A.iii) cartoons and slogan preparation and display, (A.iv) audio CDs preparation and airing, (A.v) audiovisual CDs preparation and visualization, and (A.vi) seminar and discourses. Similarly, they identified five possible characteristics of the 'stakeholder' variable- (B.i) teachers, (B.ii) Parents, (B.iii) Students, (B.iv) School administration, and (B.v) public in general. They also identified six possible characteristics of the 'place or location' variable- (c.i) assembly area, (C.ii) Student's respective houses, (C.III)Teachers' room, (C.iv) Principle's room, (C.v) class rooms or laboratories, and (C.vi) Sports field.



Matrix Diagram (Y Shape)
Identification of strength of relationship among different characteristics of variables to promote SQC to all students

The SQC team was then trained by SQC facilitator on 'Matrix Diagram' which has been used by QC practitioners to identify the strength of relationship among characteristics of different variables. The SQC team brainstormed with the help of "Matrix Diagram" to identify the strength of relationship discussing collaboratively in their team. The outcome of the brainstorming through Matrix diagram is shown in the figure shown in previous next page.

The SQC team members thus, could identify strong, moderate, weak and no relationship between variables- Activity and place, and activity and stakeholders, as well as the strength of relationship place and stakeholders. After visualizing this strength, the team put up only those activities by involving those stakeholders at those places where the strength of relationship is strong and prepared an efficient and effective action plan to promote SQC among 100 percent students at schools. For example, students were involved to prepare cartoons and slogan and displayed by them mainly at the assembly area and sports field. (refer the shaded cell of the above Y-shaped shaded matrix diagram) The action plan then became effective and efficient without wasting unnecessary time and resources.

Introduction: The matrix diagram which is one the New 7 QC tools for SQC activities. also called matrix chart shows the relationship between two, three or four groups of information. Sometimes, it is also called Quality Function deployment (QFD) tools. It can give information about the relationship, such as its strength, the roles played by various individuals or measurements. The simple table of two dimensions (variables) is a simplest form of Matrix diagram. Six differently shaped matrices are possible: L, T, Y, X, C and roof–shaped, depending on how many groups must be compared. The above example is Y-shaped, where three groups of items are related with each others. SQC team can use all these types of Matrix diagram.

Purpose: The purpose of the Matrix diagram is to identify the strength of relationship, qualitatively by discussing among SQC team members.

- L–shaped matrix relates two groups of items to each other (or one group to itself).
- T–shaped matrix relates three groups of items: groups B and C are each related to A. Groups B and C are not related to each other.
- Y–shaped matrix relates three groups of items. Each group is related to the other two in a circular fashion.
- C–shaped matrix relates three groups of items all together simultaneously, in 3-D.
- X–shaped matrix relates four groups of items. Each group is related to two others in a circular fashion.
- Roof–shaped matrix relates one group of items to itself. It is usually used along with an L – or T–shaped matrix.

Construct: Materials needed- marking pens, rulers, large writing work surface- chart paper or flipchart pages, or even white boards will do.

1. First, in the team discuss on the possible variables that are necessary to study the strength of relationship.
2. Then, identify which type of matrix diagram the team need to draw so that the strength of relationship among these variables can be studied- simple L shaped, T-shaped, Y-shaped or X-shaped. These are most widely used matrix diagram and the shape depends on the number of group of variables.
3. Discuss and identify the possible characteristics of all group of variables.
4. Draw the matrix diagram on the white working surface by markers with columns and rows depending on the number of characteristics for each variable. For 2 variables, just draw L shape, for 3 variables- the T, Y or C shaped as per the requirement and for 4 variables draw X-shaped matrix.
5. Fix the symbols (● ○ △) to be utilized for symbolizing the strong, moderate and weak relationships respectively between variables. Blank means there is no relationship. Make a legend table of these symbols.
6. Now, discuss seriously taking each variable at one time and symbolizing the cross section of that variable with another variable. If agreed by all for a particular symbol (Strong, Moderate, Weak) for the cross section of these two variables place that symbol there. Otherwise leave blank on the cross sectional cell, meaning there is no relationship.
7. This may take time, but don't haste. Ask each member and make consensus on the strength of the relationship between each characteristics of variables.
8. Review the final matrix diagram with all cells filled up with particular symbols or left blank until satisfied. The variables having strong relationship assist to make an efficient and effective plan of action.

The Matrix Diagram of hypothetical case shown above seems complicated in the first sight. However, if the team members move slowly step by step, it is one of the most interesting and very easy tool to identify the strength of relationship. Before making an action plan, SQC team should try to construct a matrix diagram.

Very simple and interesting isn't it? Students! You try it next time.