Radar Chart:

A Strong Visual Tool for observing multivariate information

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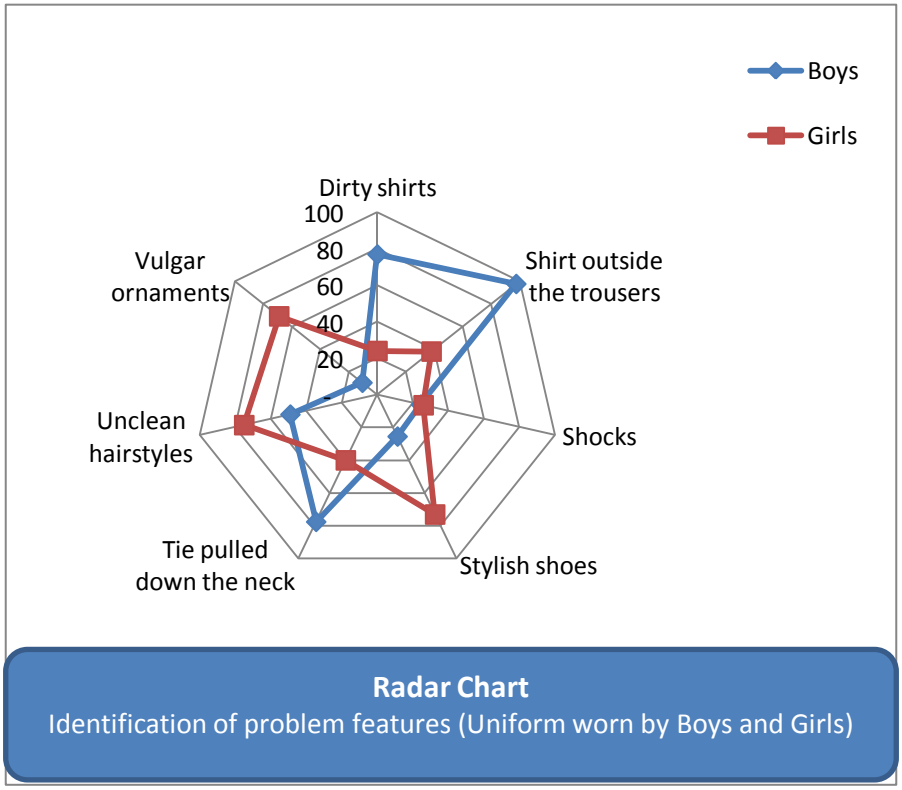
A Hypothetical Case: A Students' Quality Circle (SQC) team wanted to eliminate or at least reduce the school uniform problems they are facing these days at their school. Presently, 1,600 boys and 1,400 girls were studying at their school. It was one of the comparatively large size schools in Nepal. After observation, the team identified many features, characters or categories of the uniform problem. They don't know how to identify the intensity of all these features at one glance. They observed first, brainstormed to identify the possible features, made check sheet for data and collected information on all identified features. The team designed to pick up randomly 30 students from each grade from grade one to grade ten for observing different features of non homogeneity of their school uniforms. In total, they could observe 300 students out of which there were 200 boys and 100 girls. The total samples thus were 300 students out of 3000 students, which is 10 percent of the total population. The team tabulated these observed data in a chart and calculated percentage of each observed information as shown in the table here.

Data Table of sample observation (Uniform wear)				
Features of non homogeneity Of school uniforms	**Observed in No.**		**Calculated in %**	
	Boys	**Girls**	**Boys**	**Girls**
Dirty shirts	154	24	77	24
Shirt outside the trousers	195	38	98	38
Shocks	49	26	25	*26*
Stylish shoes	51	73	26	73
Tie pulled down the neck	155	85	78	40
Unclean hairstyles	98	21	49	75
Vulgar ornaments	21	69	11	69
Total students observed	**200**	**100**		



Radar Chart

Identification of problem features (Uniform worn by Boys and Girls)

This table shows that the school uniform problem has two dimensions- (1) **Gender** with two variables- boys and girls and (2) **Feature** with six variables (categories)- dirty shirts, shirt outside the trousers, shocks, stylish shoes, tie pulled down the neck, unclean hair styles and vulgar ornaments. Thus, it is a multi variable problem and needs multi variable analysis. Not to make the problem very difficult but just to understand the nature and intensity of the

features of the problem, the SQC team represented this table visually in a Radar chart as shown in the figure here.

Students! You study this Radar chart. What you find here? At a glance to this Radar chart, you can visually identify that the intensity of the problem are at stylish shoes, unclean hairstyles and vulgar ornaments with the girl and shirt outside the trousers dirty shirts and tie pulled down the neck with the boys. I hope you know very well about “Radar”. This equipment is used to locate the airplane, missiles or bombers at the sky high above the ground, which is impossible otherwise to locate by our human eye. This radar chart is also equally important to locate the problem features which will not be seen in the cloud of data and information.

introduction: Radar chart is also known as spider chart or star plot because it looks like spider’s web or stars. Radar chart is a graphical method of displaying multivariate data in the form of a two-dimensional chart of three or more quantitative and qualitative variables represented on axes starting from the same point, origin. The radar chart is a visual representation as a chart consists of a sequence of equi-angular spokes, called radii, with each spoke representing one of the variables. The data length of a spoke is proportional to the magnitude of the variable for the data point relative to the maximum magnitude of the variable across all data points. A line is drawn connecting the data values for each spoke. This gives the plot a star-like appearance and the origin of one of the popular names for this chart.

Origin: The Radar chart which used to be called as star plot was first used by Georg von Mayr in 1877. This is now considered as new management QC tools

Purpose: Radar chart tries to answer the questions like- which observations are most similar, i.e., are there clusters of observations? And are there outliers? What is the status of different variables before and after improvement activities? Which variables are more important to observe intensively among many variables?, and many other questions.

Construct: It is generally constructed in a team with more than four members and less than ten members. They can be called raters or observers (data collectors). If the team is constructing the radar chart with quantitative variables then team works as observers or data collectors and if the variables measurement is in qualitative terms then the team members will act as raters.

- Select and define the rating or observing categories: Chart can handle wide number of categories (5 –10 categories on average). Brainstorm to create categories. Define both non-performance (0 value) and full performance (100 percent value)within each category so ratings are done consistently

- Construct the chart: Draw a large wheel on a flipchart with as many spokes as there are rating categories. Write down each rating category at the end of each spoke around the perimeter of the wheel. The farther from the centre the better the score.

- Note down the measurement scales: Quantitative (e.g., 1-5, or 0-100), or Qualitative (e.g., Stongly agree, Agree, Disagree and Strongly disagree, or likewise)

- Interpret and use the results—a couple of notes: Overall ratings identify gaps within each category but not the relative importance of the categories themselves. Work on the biggest gap in the most critical category. Update the chart as progress is made make sure and share with others as a great visual tools used for QC problem solving.

Application: Radar Charts may be applied by SQC team for interpreting data collected on multivariate nature. It may be used at different steps of SQC problem solving process. The major applications are mainly in two steps of quality circles activities- (1) to identify the intensity of different features of problem and locate areas where the SQC has to concentrate to solve the problem. (2) to present the status of the features or causes of the problem before and after the improvement process.

Students! You try it next time.