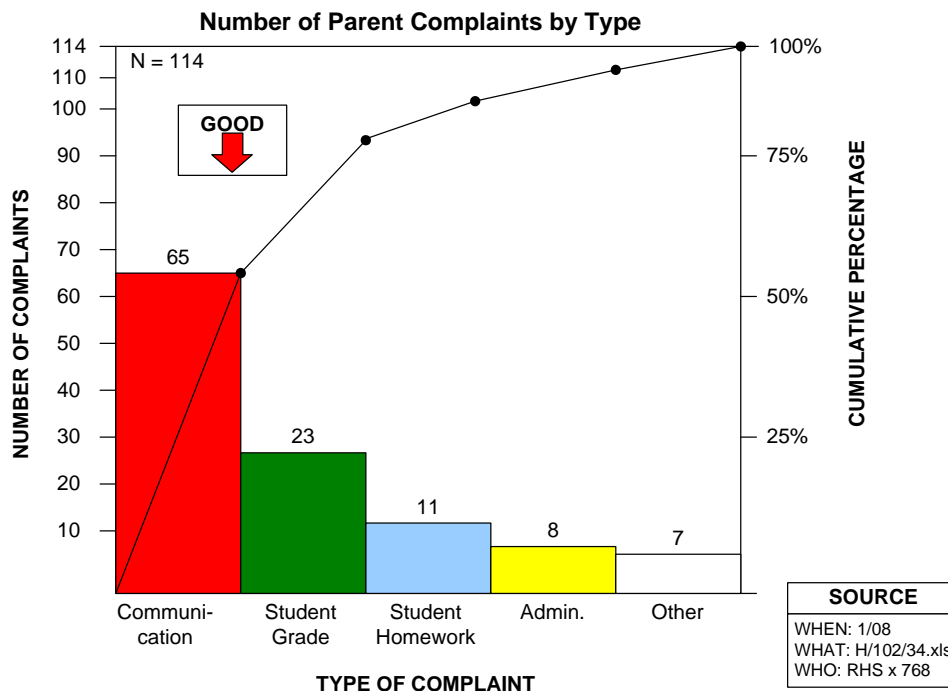# PARETO CHART

Author: Robert Seemer (rseemer@etsfl.com)

A **PARETO CHART** is a graphical tool used to rank data. This helps us to determine which problems to solve in what order. It distinguishes between the "significant few" and the "trivial many." The Pareto Chart is an excellent tool to organize and analyze data. It can be used in the following ways:

6

PARETO CHART

FREQUENCY

(WHAT, WHERE, WHEN or WHO)
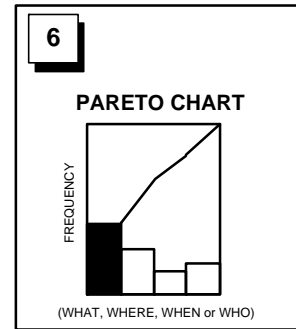
- **To identify** the most serious or most frequently occurring problems through the use of different measurement scales (frequency or cost, for example). It is based on the concept that 80% of the problems (or, at least a "large" percentage) result from 20% of the causes.
- **To analyze** different groupings of data (by student segment, school, or budget category, for example).
- **To measure** the impact of changes made in a process (before and after comparisons).
- **To break down** broad problems, themes, strategic objective measures, Q measures, or causes into more specific components for better understanding.

Pareto Chart Example

Number of Parent Complaints by Type

N = 114

GOOD

NUMBER OF COMPLAINTS

CUMULATIVE PERCENTAGE

65

23

11

8

7

Communi-cation | Student Grade | Student Homework | Admin. | Other

TYPE OF COMPLAINT

SOURCE
WHEN: 1/08
WHAT: H/102/34.xls
WHO: RHS x 768

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How to create a Pareto Chart

1. Draw one horizontal (X) and two vertical (Y) axes. On the "X" axis, draw marks to separate data groups or units of measurements. On the left "Y" axis, draw marks representing frequency or quantity and label the marks with the appropriate designations, and marks representing cumulative percentage up to 100% on the right "Y" axis.

2. Collect data for each of the groups to be analyzed.

3. List the categories (or data groups) from left to right on the "X" (horizontal) axis in their order of **decreasing** frequency or magnitude. The categories containing the fewest items can be combined into an "other" category, which is **always** placed on the extreme right as the last bar.

4. Enter data by placing a point at the proper measured position over the proper data group.

5. Draw touching vertical bars of uniform width from the "X" axis to the point in each of the data groups.

6. Draw a cumulative frequency line beginning at zero (x,o), (y,o) and proceeding through the top right corner of the first bar moving upward from left to right (this shows the cumulative frequency percentage of the categories).

7. Label the chart with other pertinent information (source block, population or sample size, for example).

Tip: When colors are used on the Pareto Chart, consider making the largest bar red to highlight the most significant factor.

Uses of Pareto Charts

Pareto Charts are useful throughout the problem-solving process. Data displayed in Pareto Charts may be stratified in different ways, such as:

1. **By Characteristics**—used to find out what the major problem is. This approach could be used in STEP 2 of the **ets Performance Excellence Process DMAIC Method** and is often used in such areas as:

   - Quality—defects, complaints, failures, and repairs.

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PARETO CHART

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- Cost—amount of loss, scrap value, and insurance claim costs.
- Delivery and Time—inventory shortages, late payments, school bus delays, and interval time.
- Safety—accidents, injuries, and doctor cases.
- Environment—energy consumption, spills, and emissions.

2. **By Cause**—used to help determine the degree and contribution from several causes of the problem in STEP 3 of the **ets Performance Excellence Process DMAIC Method**. In this case, the Pareto may be used to help verify root causes. This Pareto approach is often used in such areas as:

- Setting—equipment, facility, furniture, and instruments.
- Materials—manufacturer, lot, and substance.
- Method—procedures, conditions, and order.
- Person—shift, department, classroom, school, work experience, or tenure.