Graphical Representation of Data

General Rules for Graphical Representation of Data

There are certain rules to effectively present the data and information in the graphical representation. They are:

- Appropriate title: ***The title of the graph should be self-explanatory***. So that audience do not have any confusion in understanding the content of the graph.
- ***Axis's*** should have ***appropriate label***.
- ***Categories*** represented by ***different axis*** should be ***clearly mentioned***.
- Measurement units (if any) must be mentioned clearly.
- Use of appropriate scaling is a vital issue.
- Legends used in the graph should be duly labeled.
- Data Sources should be included where ever needed.
- Keep it Simple: Construct a graph in an easy way that everyone can understand.

Different types of charts and graphs:

Data charts are available in a wide variety of maps, diagrams, and graphs. Selection of the most appropriate chart depends on a variety of different factors, such as –

i. Objective the researcher
ii. The nature of the data,
iii. The purpose of the chart, and
iv. Types of variable etc.

For example, some of the most frequently graphs are used for

Bar chart Pie diagram	Usually used for qualitative or discrete variable
Histogram Frequency polygon Percentage polygon Line diagram Cumulative frequency polygon	Usually used for continuous variable
Stem and leaf plot	

Bar Chart

In a bar chart, a bar shows each category. The length of the bar represents the amount, frequency or percentage of values falling into a category.

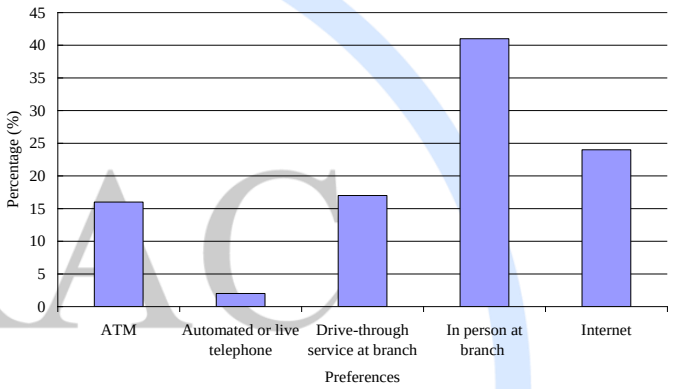
Example 1:

Figure 1 displays the bar chart for the people's preference to do their banking as depicted in table 1. Bar chart allows researchers to compare the percentages in different categories. In figure 1: respondents are most likely to bank in person at a branch and on the internet, followed by drive through service at a branch and ATM. Very few respondents mentioned automated or live telephone.

Table 1: Table of percentage distribution of banking preference of the customer of BANK XYZ

Banking Preference	Frequency (%)
ATM	56(16%)
Automated or live telephone	7 (7%)
Drive-through service at branch	63 (18%)
In person at branch	140 (40%)
Internet	84 (24%)
Total	350 (100%)

Figure 1: Bar chart for Banking Preference



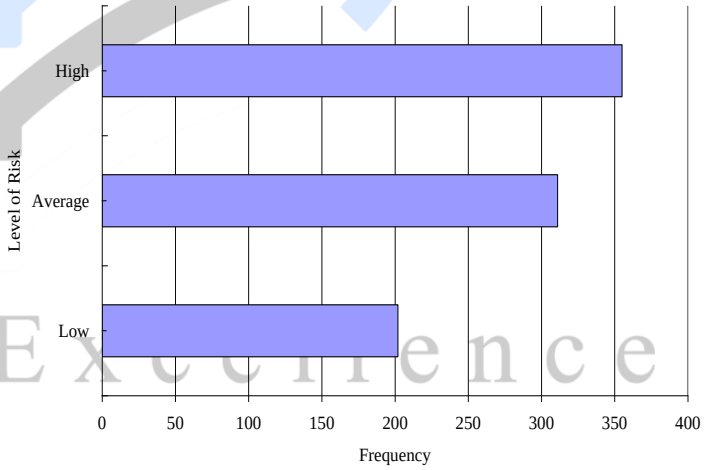
Example 2:

A sample of 868 mutual funds has been selected and questions were asked to assess and categories the risk associated with the customer's investments in mutual funds. Of the 868 mutual funds 202 funds are classified as the low risk funds, 311 funds are classified as average-risk fund and the rest of 355 funds are categorized as high- risk. Hence the ***summary table***[1] of levels of risk of mutual funds is given below.

Table 2: Frequency and Percentage Summary table of Risk Level for 868 Mutual Funds

Fund Risk Level	Number of funds	Percentage of funds (%)
Low	202	23.37
Average	311	35.83
High	355	40.89
Total	864	100.00

Figure 2: Bar Chart for Level of Risk



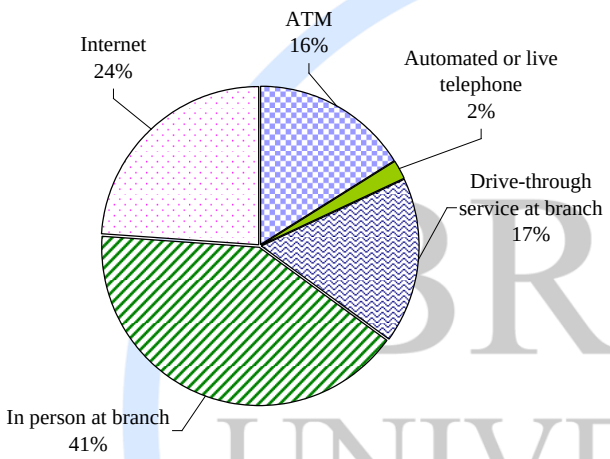
[1] A ***summary table*** indicates the frequency, amount or percentage of items in a set of categories so that one can see differences between the categories. A ***summary table*** lists the categories in one column and the frequency/ percentage / amount in a different column.

The Pie Chart

The Pie Chart is a Circle broken up into slices that represent categories. The size of each slice of the pie varies according to the percentage in each category.

In table 1 of this lecture 16% of the respondents stated that they prefer to bank using ATM. Thus in constructing the pie chart, the 360 degrees that makes up a circle is multiplied by 0.16, resulting in a slice of the pie that takes up 57.6 degrees of the 360 degrees of the circle. In this figure, bank in person at the branch takes 41% of the pie and automated or live telephone takes only 2%.

Figure 3: Pie Chart for Banking Preferences



In case of pie diagram –

Angle of the slice of pie for a particular category α Frequency (or Percentage) of that particular item.

If the frequency / value / percentage of any component is f from the whole N then the angle of pie for that particular component is

$$\theta^0 = \frac{f}{N} * 360^0$$

Which chart should one use – a bar chart or a pie chart?

The selection of a particular chart often depends on the intention of the researcher. If a comparison of categories is most important, one should use a bar chart. If observing the portion of the whole that is in a particular category is most important, one should use a pie chart.

Test yourself
Assignment 003

1. Complete the following table.

Grades on Statistics examination	Frequency	Relative Frequency	Percentage
A: 90 – 100		0.08	
B: 80 – 89	36		
C: 65 – 79	90		
D: 50 – 64	30		
F: Below 50	28		
Total	200	1.00	

2. Following are the different brands of laptops sold form a computer shop.

Y	X	X	Z	X	Y	Y	Y	X	X
Z	X	Y	Y	X	Z	Y	Y	Y	X

   a. Construct a frequency distribution table for the information given above.
   b. Compute the relative frequency for each of the brands and comment on the market share.
   c. Display the results, part a, in a frequency bar graph.
   d. Display the results, part b, in a pie chart.

3. Assume telecommunication companies in Bangladesh spent about BDT 300 million in advertising. The spending is as follows:

Media	Amount ($ millions)	Percentage (%)
Radio	20	6.67
Internet	30	10.00
Cinema	5	1.67
Direct mail	15	5.00
Magazines	35	11.67
Newspapers	65	21.67
Outdoor	45	15.00
TV	35	11.67
Other	50	16.67
	300	100

   a. Construct a bar chart and a pie chart.
   b. Which graphical method do you think is best to portray these data?

4. The following data set represents the scores on intelligence quotient (IQ) examinations of 40 sixth-grade students at a particular school:

114	122	103	118	99	105	134	125	117	106
109	104	111	127	133	111	117	103	120	98
100	130	141	119	128	106	109	115	113	121
100	130	125	117	119	113	104	108	110	102

   a. Organize the data in classes such as 90 – 100, 100 – 110 and so on.
   b. Present the data set in a frequency histogram.

5. The international Rhino Federation estimates that there are 25280 rhinoceroses living in the wild in Africa and Asia. A breakdown of the number of rhinos of each species is reported in the accompanying table.

Rhino Species	Population Estimate
White rhino	18000
Black rhino	4240
Greater One-horned rhino	2800
Sumatran Rhino	200
Javan Rhino	40
Total	25280

a. Construct a relative frequency table for the data.
b. Display the frequencies in a bar graph.
c. Display the frequencies in a pie chart.
d. What proportion of the 25280 rhinos are White rhinos? Black?

For any queries related to this presentation please contact
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