Chapter Four: Graphical Presentation

When you completed this chapter, you will be able to:
- ✓ understand the use and the importance of graphical presentation;
- ✓ recognise the features of varies graphical presentations; and
- ✓ organise and present the collected data in the most effectively way.

Reference(s): Mason Chapter 2, Owen Chapter 2 and 3
Exercise(s): Seminars 6, Mason Chapter2 Exercises 44 -46

Problem Area	➔	Collecting the Data	➔	Deriving the Statistics (analyse the data)	➔	***Communicating the results*** (tables, graphics, charts, words)

For tabulating data, summary tables, line charts, bar charts, pie charts, as well as other graphics can be useful.

Graphics can be used as an *effective method of* ***visual communication***. Statistical graphic is beneficial for the presentation and analysis of data. Various simple statistical graphics can be used to present the data in a meaningful pattern.

We have to *choose a picture that will most effectively display whatever features* of the data needed to emphasise.

1. Summary Table

To illustrate the development of a summary table, let us consider a case as follows :

e.g.1 The numbers of reference books in the BA Departmental Library: 40 Statistic books, 25 Management books, 80 Accountancy books, 60 Insurance books, and 45 other reference books.

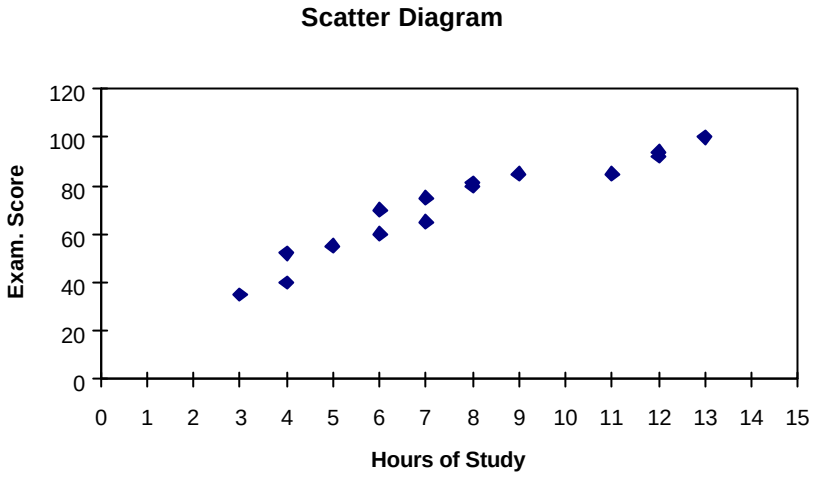
Table: Frequency and percentage summary table for BA Departmental Library

Type of books	No. of books	Percentage of books
Statistic	40	16
Management	25	10
Accountancy	80	32
Insurance	60	24
Other	45	18
Total	250	100

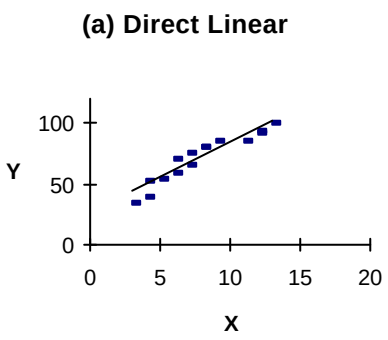
Note: there are table *Title*, *Description for the table*, and *Column Heading* listed.

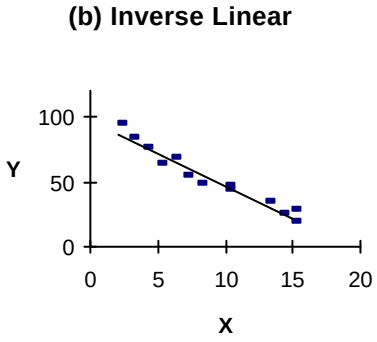
2. Scatter Diagram

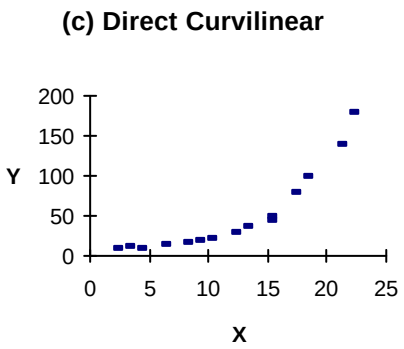
In a scatter diagram, the individual points are scatter over the graph. The scatter may show a relationship between two quantitative variables. The pattern of the scatter of the points provides insights into the ***existence and nature*** *of the relationship between the two variables*.

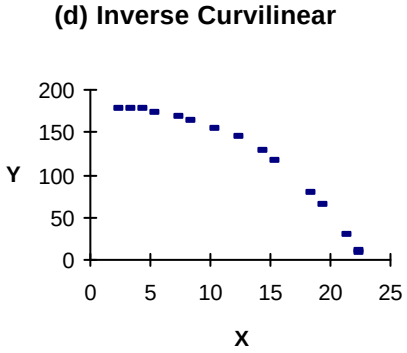


Possible relationships between two variables, the ***independent*** *variable X* and ***dependent*** *variable Y,* are :

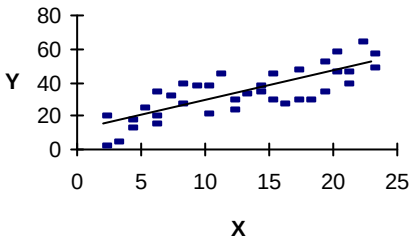




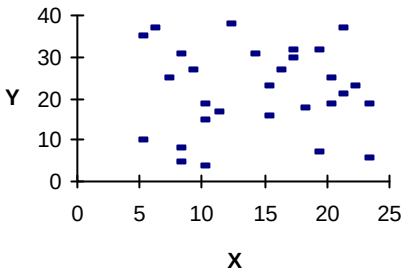




(e) Direct Linear with more scattering



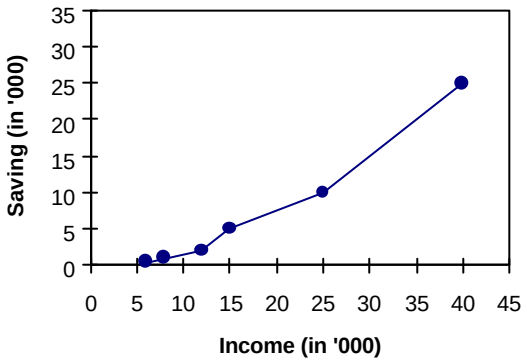
(f) No Relationship



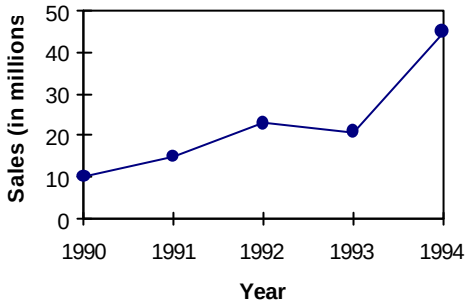
3. Line Chart

Line chart use lines between data points to depict the magnitudes of data for *two* ***quantitative*** *variables* or for *one variable over time.* The ***height*** *of the line allows the user to* ***compare magnitude*** *easily.*

(a) Line Chart depicting relationship between two variables



(b) Line Chart depicting Sales over Time



It reflects the moving total, moving average with the seasonal variations taken out - it is the ***trend*** *line.*

4. Bar Chart

Bar chart is used to depict the magnitude of data for *different* ***qualitative categories*** or *over* ***time***.

Several points to note :

1. Bar chart consists of vertical or horizontal bars.
2. all bars should be in ***same width***, but the width of each bar has no special meaning.

3. spaces between bars are suggested to range from one-half the width of a bar to the width of a bar.

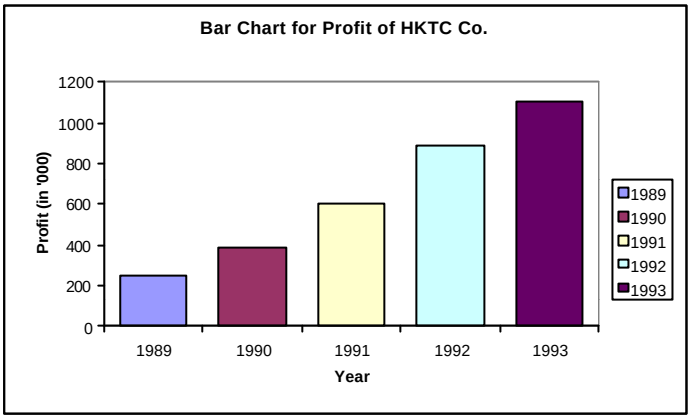
4. scales and guidelines are useful aids in reading a chart and should be included.

5. the axes of the chart should be ***labelled***.

6. any "keys" to interpreting the chart may be included within the body of the chart or below the body of the chart.

7. the title of the chart appears either below or above the body.

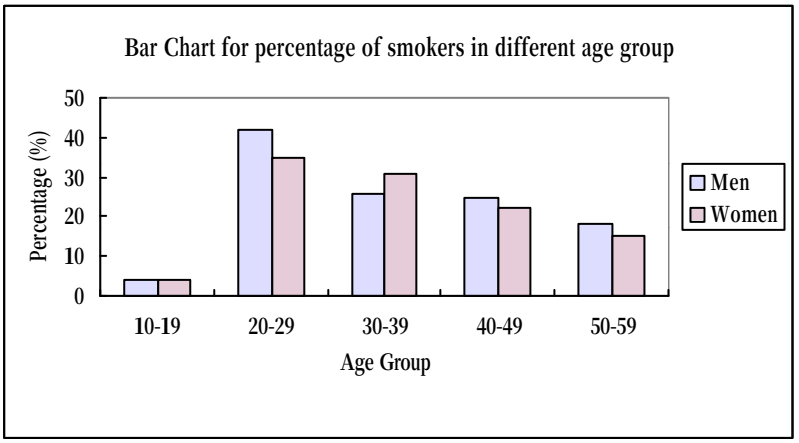
8. footnotes and source notes, when appropriate, are given following the title of the chart.

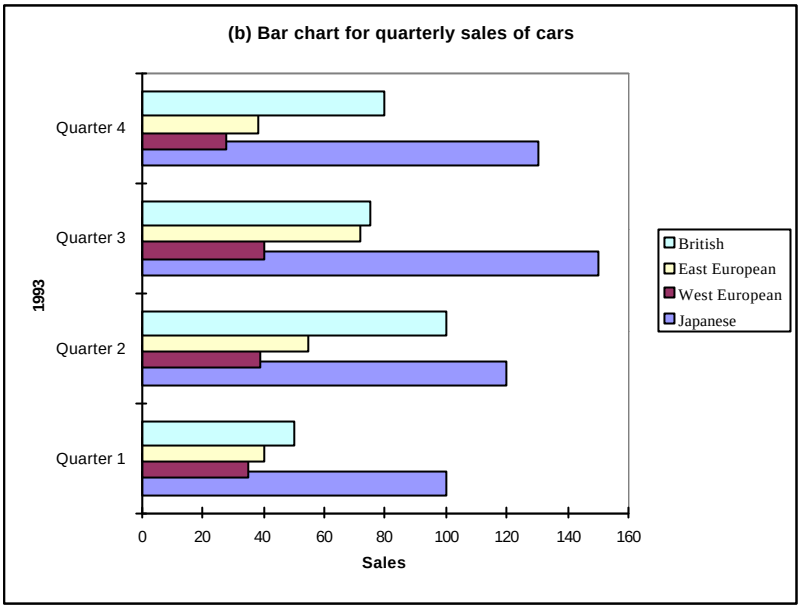


5. Grouped Bar Chart

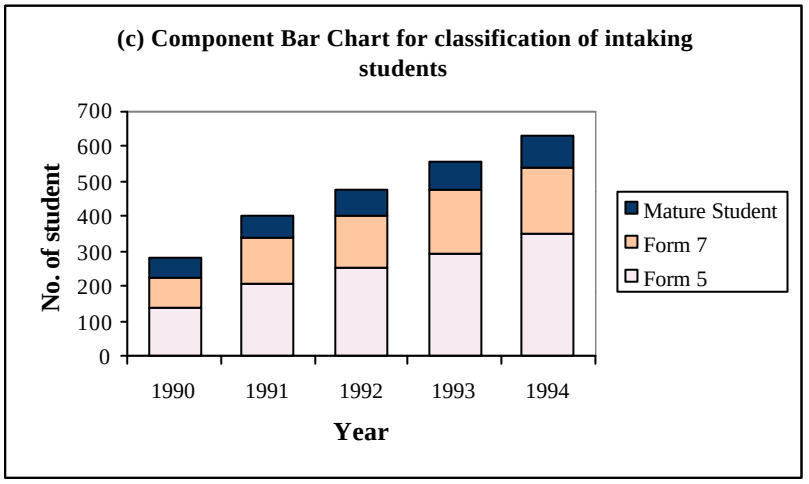
Grouped bar chart is used to depict the magnitudes of ***two or more*** *grouped data items* for *different qualitative categories* or *over time.*

Multiple Bars: A number of single bars ***superimposed on top of*** each other. The purpose of such a chart is to contrast more than one sequence of data values. The following chart shows the relative percentages of smokers in different age groups and contracts the difference between men and women. Here the relative percentage of men and women are highlighted by using contrasting shading.



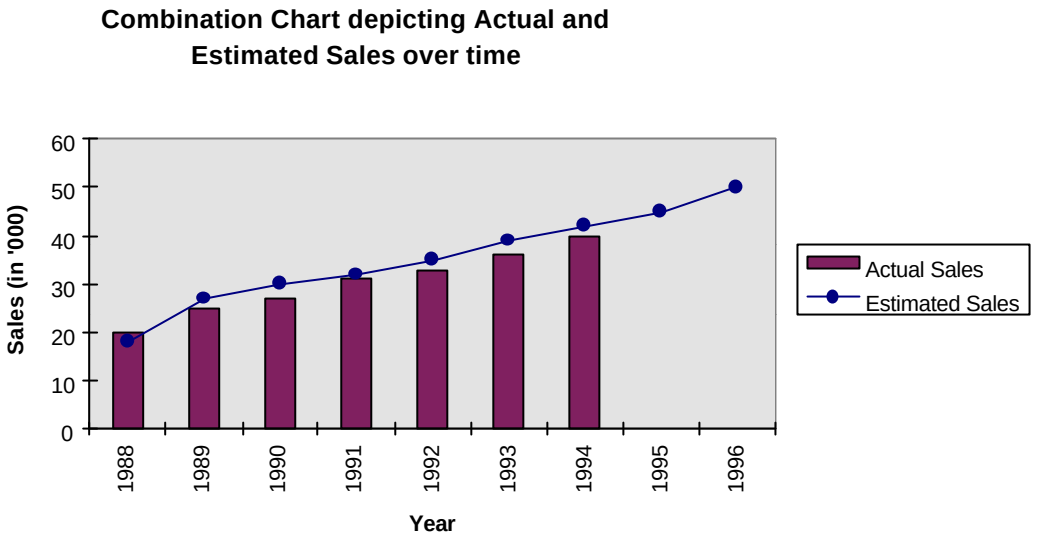


Component Bar Charts: they are multiple bars laid directly ***on top of*** each other.
Different shading is used *to distinguish* one set of bars from another.



6. Combination Charts

We may use ***lines and bars*** to depict the magnitudes of *two or more data values* for different categories or for different times.

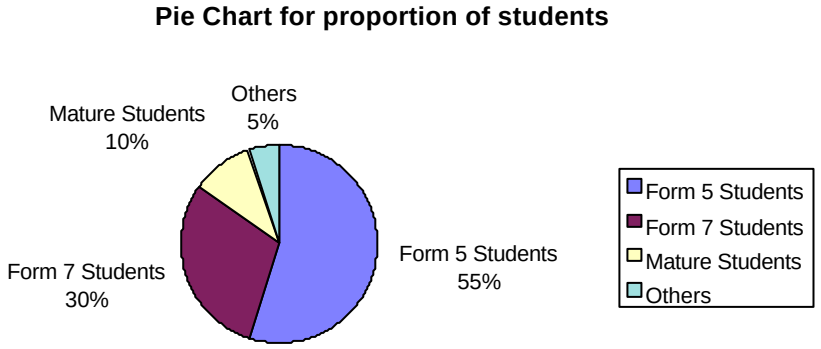


7. Pie chart

A Pie Chart consists of a circle representing the whole with segments marked off *representing the proportions*. To distinguish the proportions the segments can be shaded.

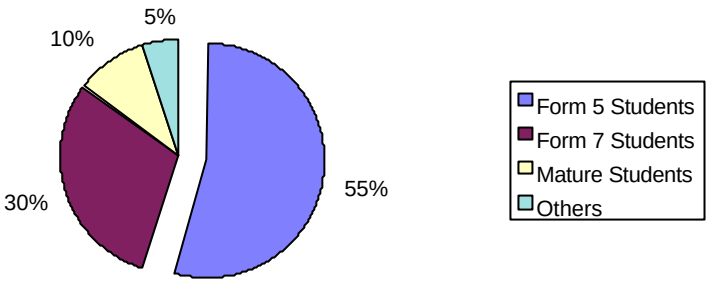
Pie Chart is used effectively to depict the ***proportion or percentages*** of a total quantity that correspond to several qualitative categories (usually five or fewer). Each Category is depicted as a wedge of a circle, or a piece of pie. *The angle (in degrees) of each wedge is equal to the category's proportion multiplied by 360^{o}.*

Shading also makes the picture more interesting. Notice the key to explain the shading in the following picture.



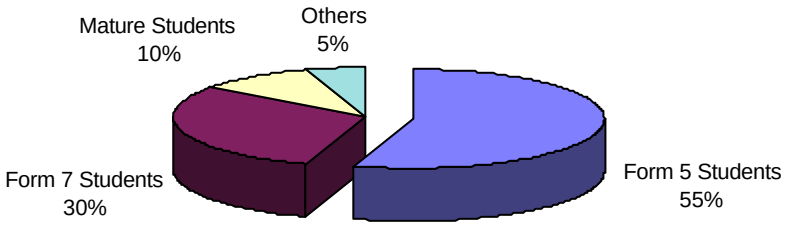
Exploded Pies: An exploded pie has one or more segments *slightly removed* as shown in the following picture. An exploded pie *gives* ***dramatic effect***. In this pie, the proportion of Form 5 students is highlighted. By exploding the pie in this way the eye is drawn to that particular proportion.

Exploded Pie Chart for proportion of students



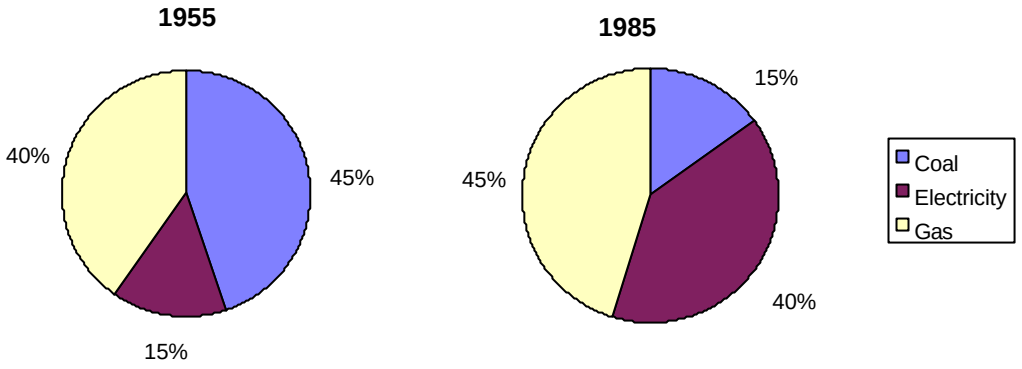
Three-dimensional Pies : Using three-dimensions in an exploded pie makes the picture much *more eye-catching*. In this case, the proportion of Form 5 students is also highlighted, the use of a 3-D pie adds a special touch.

3-D Exploded Pie Chart for proportion of students



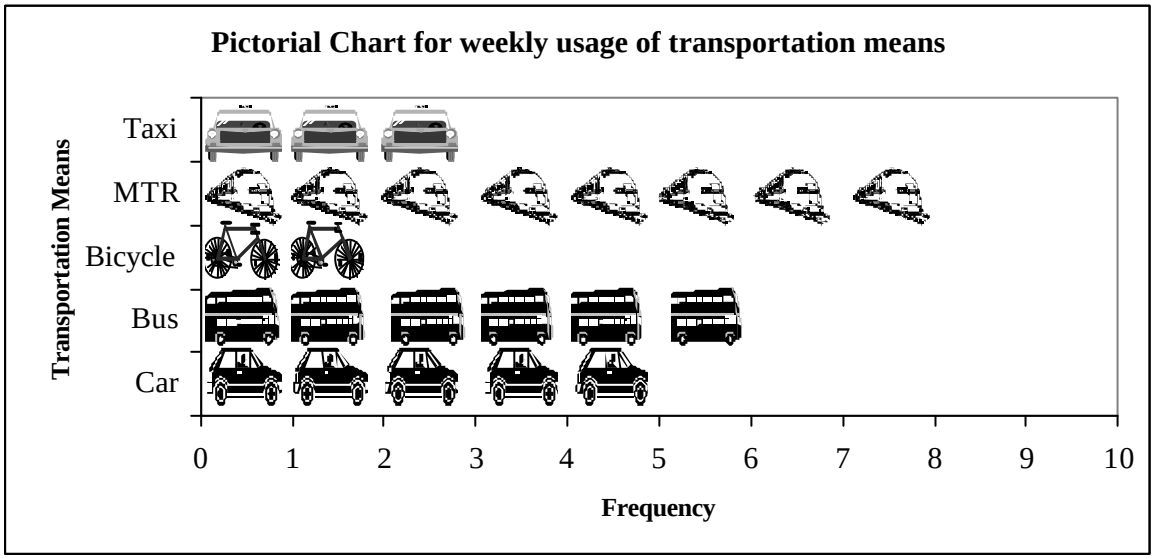
Comparative Pies : Comparative pies can be used to compare ***relative proportions*** at two different times and so illustrate changes in the proportions.

Comparative Uses of Different Fuels



8. Pictorial Charts

Pictorial symbols are used to depict data, there are often used to gain attention, but they can be *difficult to interpret*, and are also *misused at times* when dealing with the two-dimensional or three-dimensional symbols.



General Features of Data

The purpose of a picture is to display the general features of data. Consequently, the feature to be displayed will determine the type of picture used.

1. Relative sizes of data

The following statements concern the relative sizes of data, the most effective way to illustrate measurements of relative size is to use ***Bar*** charts.

Women have a greater life expectancy than men.
Men are generally taller than women.
There is less black and white TV sets than colours.

2. Proportional sizes

The most effective way to illustrate proportional sizes of data is to use ***Pie*** charts.

3. Change in data over time

The following statements concern the changes in data over time. The most effective way to illustrate changes in data over time is to use ***Line*** charts.

Between 1961 and 1981, the relative price index of domestic gas fell steadily whereas that of domestic electricity remained the same.

Consumer spending on personal telephones has steadily risen over the past twenty years.

4. ***Pictorial*** charts can be designed to both convey the necessary message and to ***catch eye*** of the casual reader.

5. The use of ***words*** is important for ***summarising*** a table or picture, e.g. heading and title, and for conclusion

Within each category of picture there are a number of choices. The choice will be determined by the data.