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CHAPTER 1

Introduction to Data Visualization

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Learning Outcomes

This chapter aims for learner to be able to:-

1. Review existing definitions of data visualization.
2. Recognize the roles of data visualization in various fields.

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Data Visualization

Data	the quantities, characters, or symbols on which operations are performed by a computer , being stored and transmitted in the form of electrical signals and recorded on magnetic, optical, or mechanical recording media. Source : Google
Visualization	the representation of an object, situation, or set of information as a chart or other image. Source : Google

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Data

Items	Amount (MYR)
1 Study fee	1900
2 Food	600
3 Mobile phone	500
4 Books	300
5 Printing	200

Quantities **Characters** **Symbols**
 ا ب ت ABC 象形字 ← ↵
 123 आ ई क ≠ #

Computer

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Visualization

Distribution analysis created with MS Excel 2016

Student Expenses per semester

Text analysis generated with <https://www.wordclouds.com/>

Location analysis with map created with MS Excel 2016

Network analysis with Sankey diagram generated with Google Charts

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Data Visualization

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Data Visualization Decision

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Definitions by others

*“Data visualization is defined as the use of data presented in a **graphical** or pictorial manner.”*
[\(T. J. Bringham, 2016\)](#)

*“Visualization is the **graphic** presentation of data - portrayals meant to reveal complex information at a glance.”*
[\(J. Steele & N. Iliinsky, 2010\)](#)

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Definitions by others




*“Data visualization is the presentation of data in a pictorial or **graphical** format.”*
[\(SAS, 2017\)](#)

*“Data visualization tells multilayered stories to engage **decision** makers in deep exploration.”*
[\(IBM, 2017\)](#)

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Why Data Visualization?

- Making decisions is a needs for everybody at all layers – personal, organizational, regional, national and global.

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Application of Data Visualization

3D ultrasound scan in health industry.

"ultrasound transducers send pulses of high frequency sound into the body and then listen for the echo."

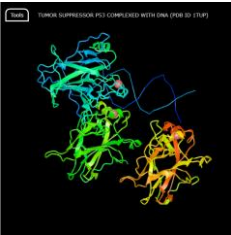


Source : [Staecker](#)

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Application of Data Visualization



3D structure of Tumor Suppressor P53 complexed with DNA, PDB ID 1TUP, with corresponding sequence data.

Source : [National Center for Biotechnology Information, U.S. National Library of Medicine](#)

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Application of Data Visualization

Titivangsa Sentral, Kuala Lumpur, Federal Territory of Kuala Lumpur, Malaysia

Weather forecasting.



Source : [weather.com](#)

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Application of Data Visualization

Stock exchange.



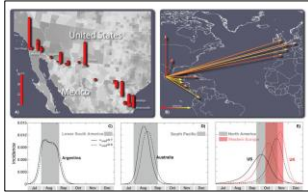
Source : Google Finance

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Application of Data Visualization

Influenza pandemic prediction.

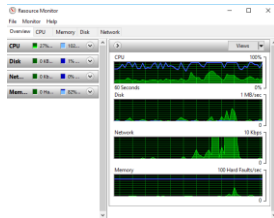


Source : Balcan et al; licensee BioMed Central Ltd. 2009

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Application of Data Visualization



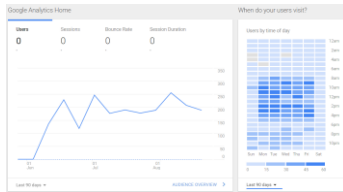
Resource monitoring in Windows Operating System.

Source : Microsoft Windows 10 Task Manager Dashboard

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Application of Data Visualization



Web analytics.

Source : Google Analytics

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Summary

- Various data visualization definitions share similar key word, '**graphics**'.
- The aim is to facilitate **decision making by human**.

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Last accessed : 26th August 2017

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Learn more

- https://youtu.be/P3kEni_xxTU

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