Learning of concepts and principles of IT

- Aim
  - Determine the level of mastery of the learning goals for Assignment 2
    - according to the learning model
- Core literature:
  - Chapter 5. Learning IT concepts
- Additional literature
  - Aharoni, D. (2000) Cogito, ergo sum! Cognitive processes of students dealing with data structures
  - Furuta, T. (2000) The Impact of Generating Spontaneous Descriptions on Mental Model Development

Understanding in addition to skills

Learning IT never ends

- New functionality
- New installations of software
- New versions of software
- New vendors
- New software types
- New hardware

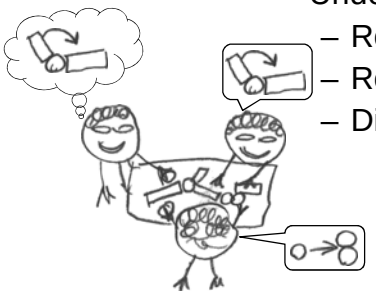
Understanding ease learning compared to skills only

Understanding IT concepts neccessary for IT competence

Consider the concepts / principles in Assignment 2. How did you come to understanding them?

Constructivism: Experience precede reflection

- **Experience** through interactions with
  - Other learners
  - Teachers
  - Computers
  - Books and documentation
  - and the rest of our environment
- Understand through **reflection** on experience
  - Relate it to previous experience
  - Relate it to concepts, models, theories…
  - Discuss it with others



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Constructing new understanding

- Learning is based on existing competence
  - We construct our own skills and understanding
  - Understanding and skills are not transferred
    - We don't copy the teacher's competence
- Understand new concepts based on
  - Previously understood concepts
    - From IT
    - From other areas
  - New experience

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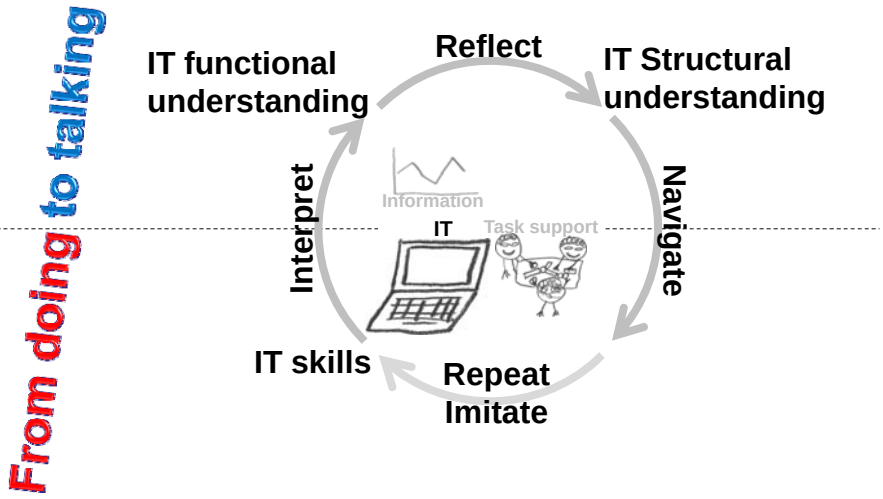
Learning IT concepts – levels of mastery



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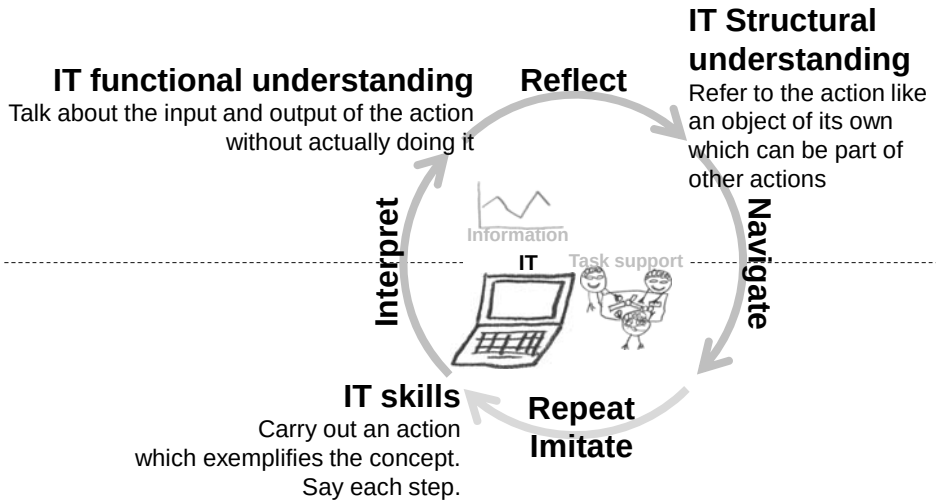
Levels of mastery – descriptions



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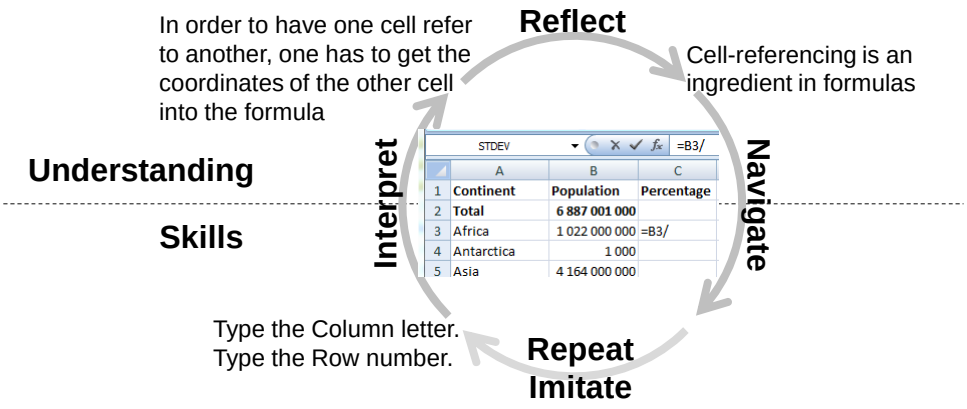
Levels of mastery – example



Exercise

- When requested to explain graphs in spreadsheets, we get the following responses:

  Gloria:

  – Graphs are drawings of numbers. They show us the numbers so that they are easier to compare.

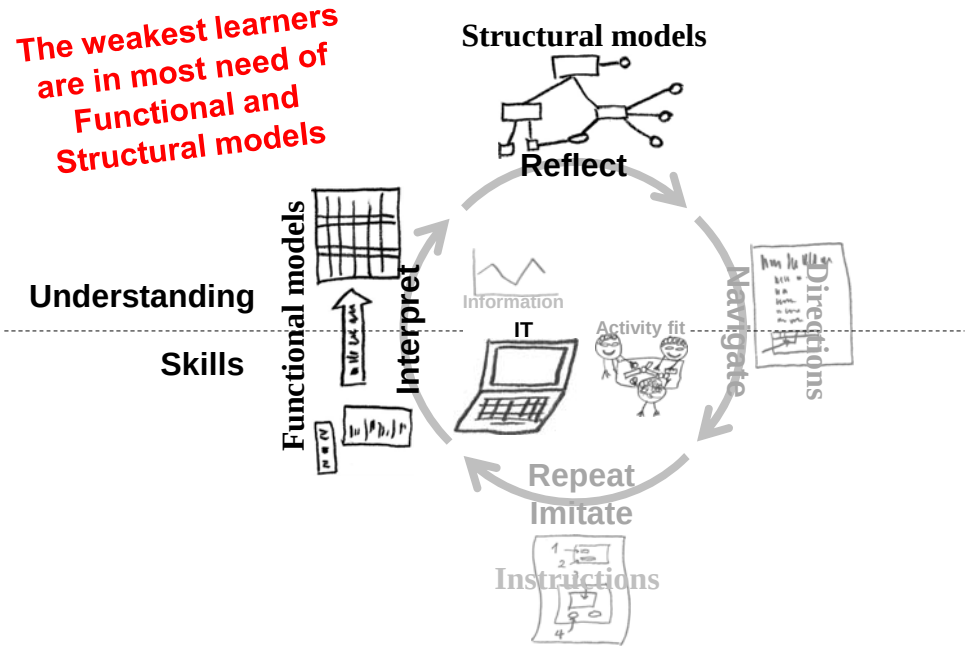
  Jussi:

  – The graphs are linked to the numbers, so when I change a number, the graph will also change.

  Yma:

  – We make graphs by selecting the numbers to be charted, and then choose the graph type. We can change the format of the graph afterwards.

- At which levels of skills or understanding of IT concepts are Gloria, Jussi and Yma?



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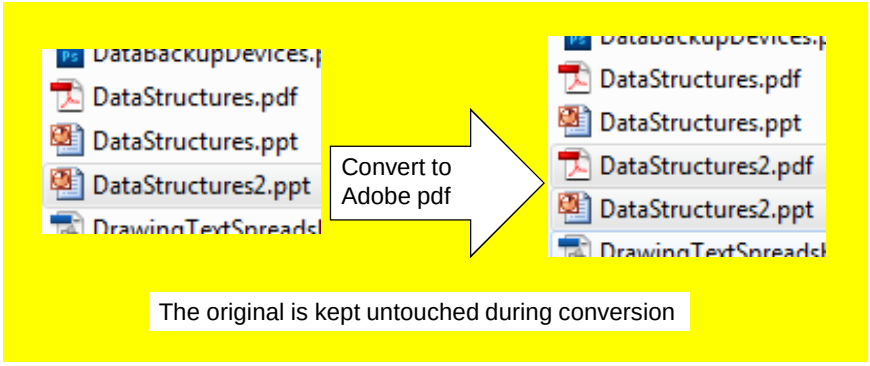
Functional model for understanding IT

1. Status before operation 2. Operation 3. Status after operation



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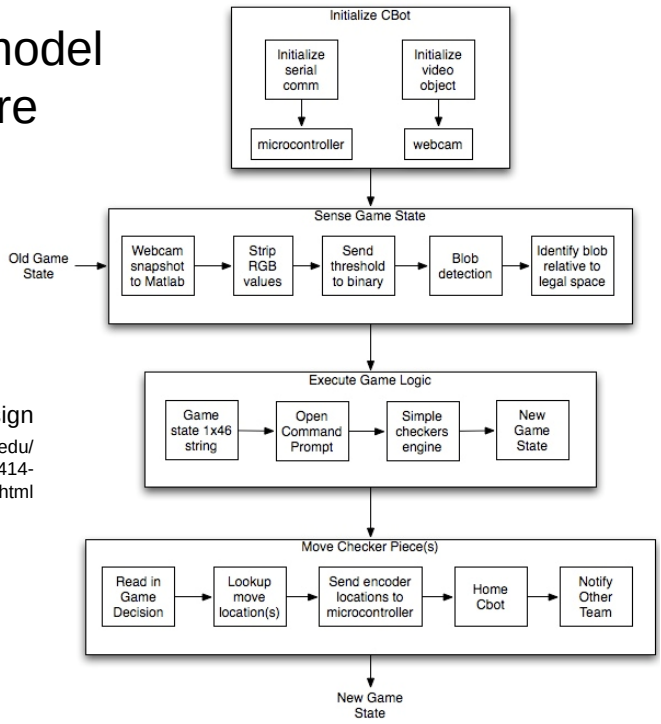
Functional model of software



CBot Design

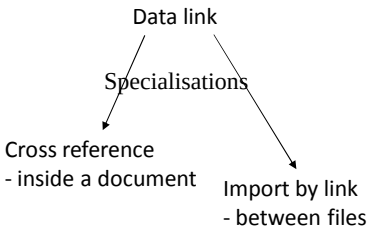
http://classes.engr.oregonstate.edu/mime/spring2010/me414-001/g2/pages/system.html

Structural models

- Designers' Structural model of the system
  - Application specific IT concepts
  - General IT concepts
- Reflection is NOT a sequential process

  →Express Structural models as illustrations with short texts

Structural model of IT – Generalisation-specialisation



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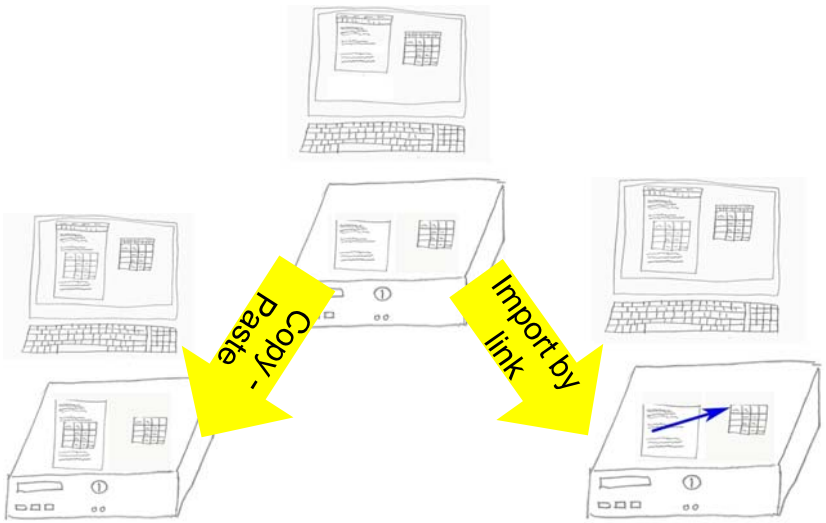
Functional and Structural model of IT – Discrimination

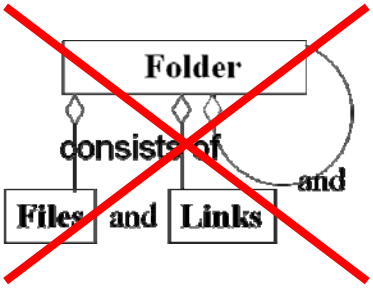


Inconsistencies when updating the spread sheet

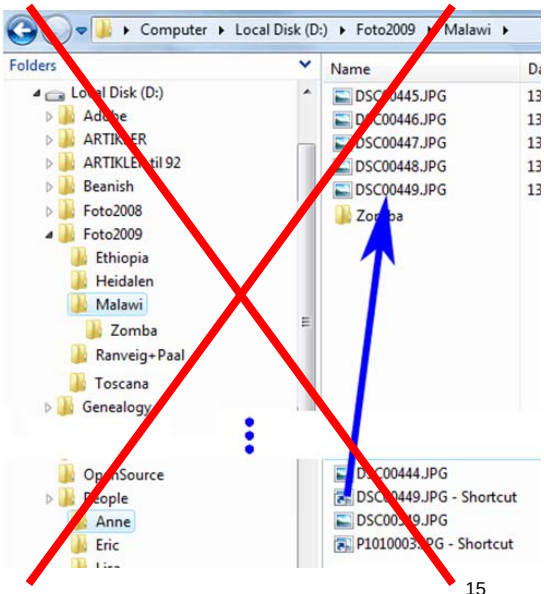
Inconsistencies avoided 14

Graphics

- Recognisable
- Simple
  - Only essentials

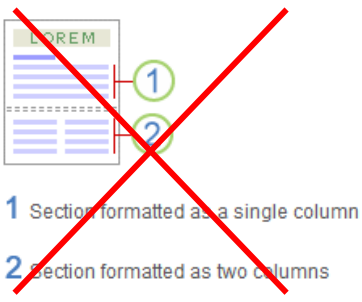


Unknown notation

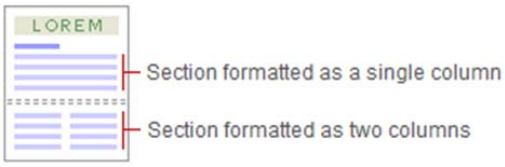


Too many insignificant details

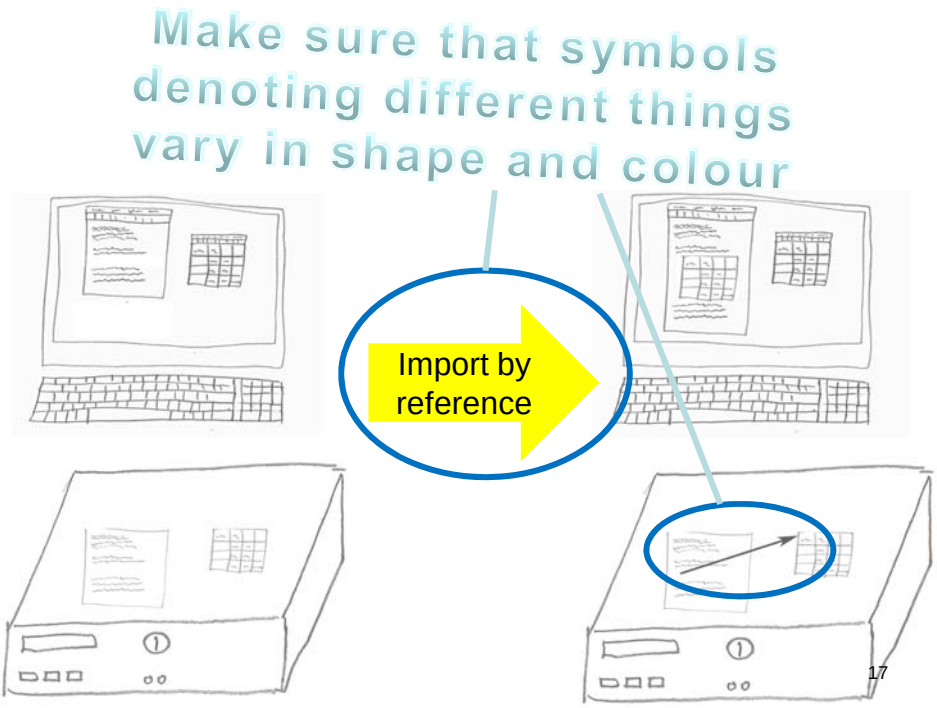
Avoid codes



Place related contents next to each other



Microsoft Help
Word > Page breaks and section breaks
> Insert a section break



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Video

- Make learners feel being in a conversation
  - We and you
  - Learning agent
  - Natural voice
- Describe complex visuals with audio only

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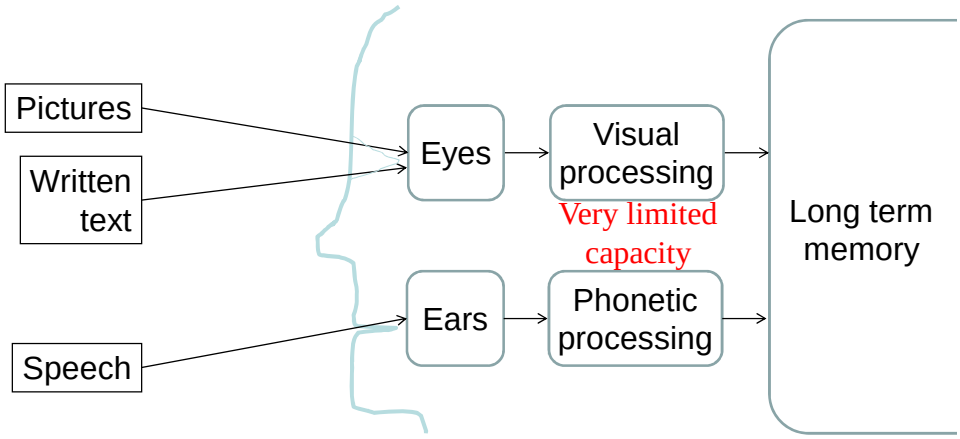
Exploiting both the visual and oral channels



- Teaching and videos
  → Minimum of written text

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Aspect	Explanation	Example – Styles in text processors
Purpose - Why	The usefulness of the concept	Provides uniform layout throughout a document
Functionality – What	The transformation which it causes.	When applying a style to a paragraph, the paragraph becomes formatted as specified in the style. When modifying a style, all paragraphs adhering to the style are changed accordingly.
Contents (data) – What	The constituents	A style is a collection of all formating instructions for a paragraph.
Internal structure – What	How the constituents are organised.	Formatting instructions are divided into character level, the whole paragraph layout, and special items like bullets.
External relations - What	How its instantiations relate to instantiations of other concepts	All paragraphs belong to a style.
Comparisons with other concepts	Similarities and distinctions to other concepts.	Style and master slides determine layout of portions of a file. Styles apply to paragraphs, while master slides apply to slides.

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Aspects of a concept

Make a table of the Aspects of the

Concept(s) for Assignment 2

Or

1. Pixel
2. Paragraph
3. Phone book
4. Song
5. Tag
6. Web site
7. Folder

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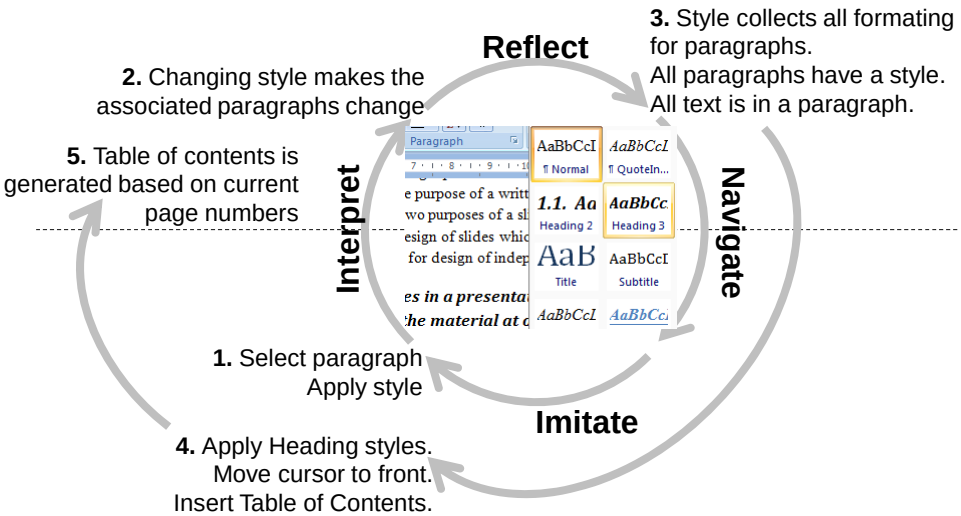
Learning a new concept based on a previous one



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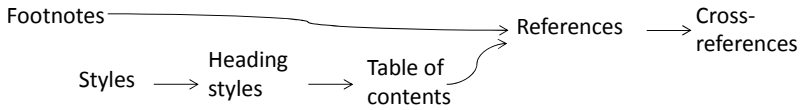
Sequence of learning concepts



Type of relation	Learning sequence	Example
Builds-on	The concept built on is learnt first	Addition before Multiplication
Generalisation-specialisation Class-Subclass	Two special concepts learnt before the generalised	Cross reference and Hyperlink before Link
Discrimination	Any order	

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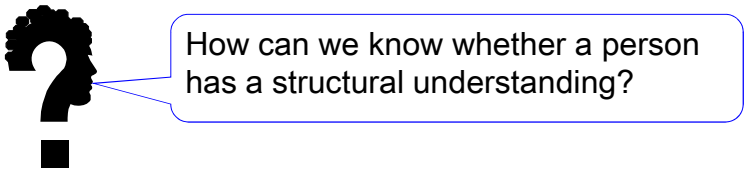
Summary

- Skills for using IT
- Understanding for learning new skills
- Structural understanding for learning new concepts



- Slow learners are in more need of functional and structural models
- Variety of learning material help all learners

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