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Visualising the hidden

- Aim
  - Visualise for understanding in all three subject matter areas:
    - Information
    - IT
    - Tasks
- Literature:
  - Chapter 9.3 Visualising the hidden and abstract
- Other material
  - Hearst, M. (2003) Information Visualization: Principles, Promise, and Pragmatics. CHI 2003 tutorial.
  - Tufte (2009) The work of Edward Tufte and Graphics Press

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Externalisation of concepts

- **IT skills**
  - Carry out an action which exemplifies the concept
- **IT functional understanding**
  - Refer to the input and output of the action when talking about it, without actually doing it
    - In order to have one cell refer to another, one has to get the coordinates of the other cell into the formula
- **IT conceptual understanding**
  - Refer to the action like an object of its own
  - which can be part of other actions
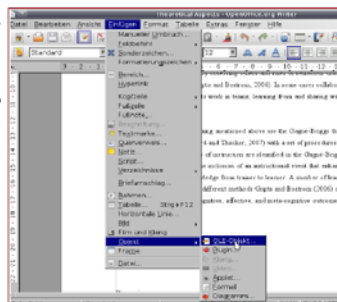   - Cell-referencing is an ingredient in formulas

Abstraction

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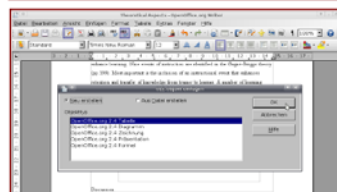# Visualising for supporting skills

- For recognising steps

Creating a new object in the Word document:
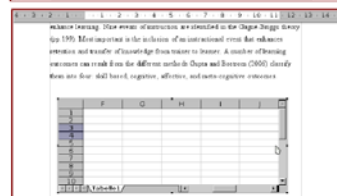
1) Click on:
„Insert" → „Object" → „OLE-Object"

2) A new dialogue appears.

Select:
„Create new" and click „Ok"

3) A new object is placed in the text document. In this object you can create tables easier than in Word itself.
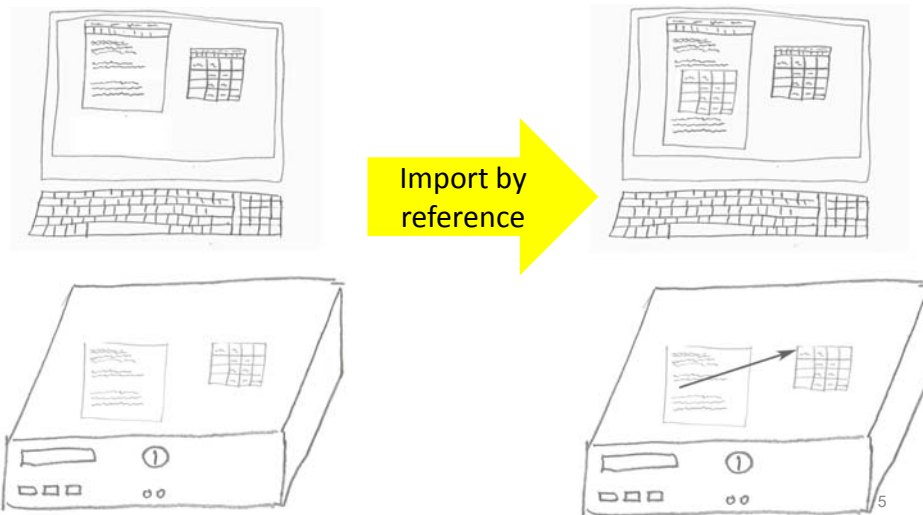But unfortunately not all features from Excel are supported.

Visualising for supporting functional understanding

Convert to Adobe pdf

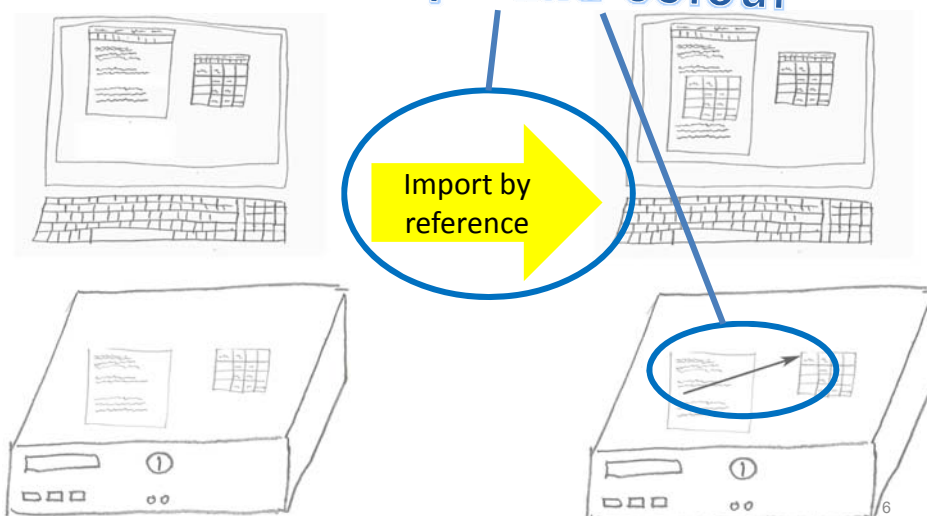The original is kept untouched during conversion
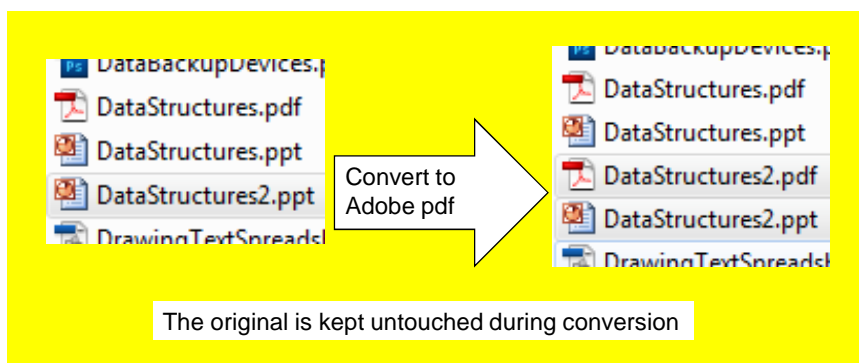
1. Status before operation   2. Operation   3. Status after operation

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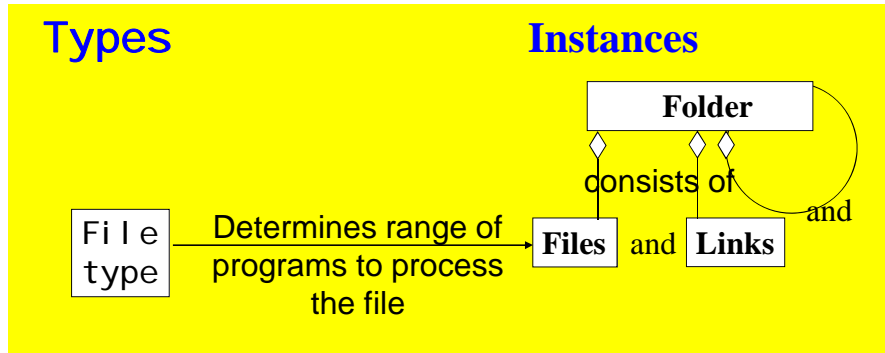When structures are hidden below the surface

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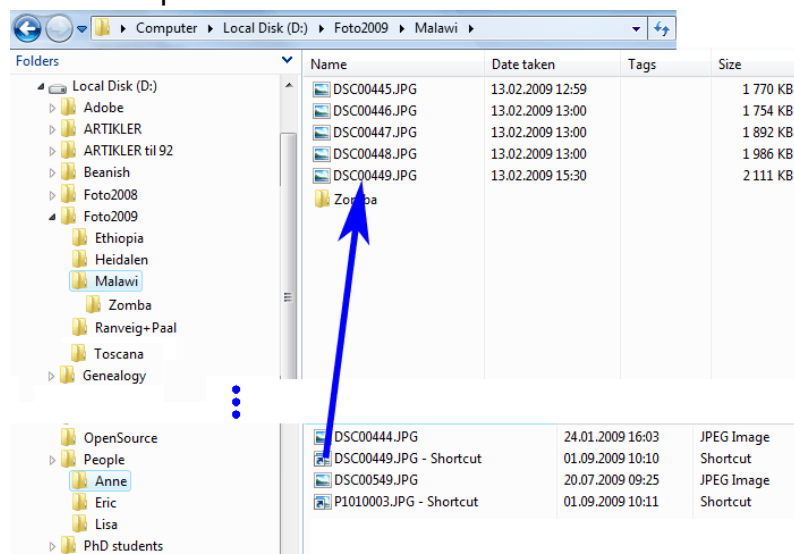## Visualising for supporting conceptual understanding

- Relating concepts

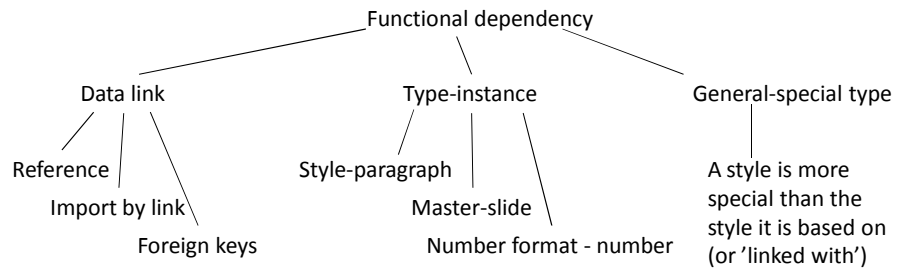- Symbols unrecognisable by users

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Recognisable

- More complex

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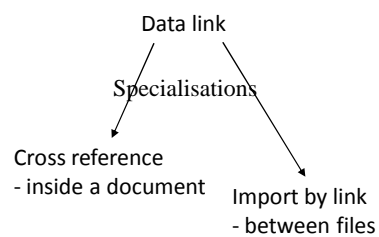
Similarities between concepts

```
                        Functional dependency
            ┌──────────────────┬───────────────────┐
        Data link         Type-instance      General-special type
       ┌────┼─────┐        ┌────┼─────┐
  Reference  │    │   Style-paragraph │   │      A style is more
       Import by link │       Master-slide │    special than the
              Foreign keys        Number format - number   style it is based on
                                                   (or 'linked with')
```

- Introduce parts of this model at a time

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Initial display

- Also showing differences

```
                Data link
                    │
             Specialisations
            ┌────────┴────────┐
    Cross reference      Import by link
    - inside a document  - between files
```

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Comparing concepts

Inconsistencies when
updating the spread sheet

Inconsistencies avoided 11
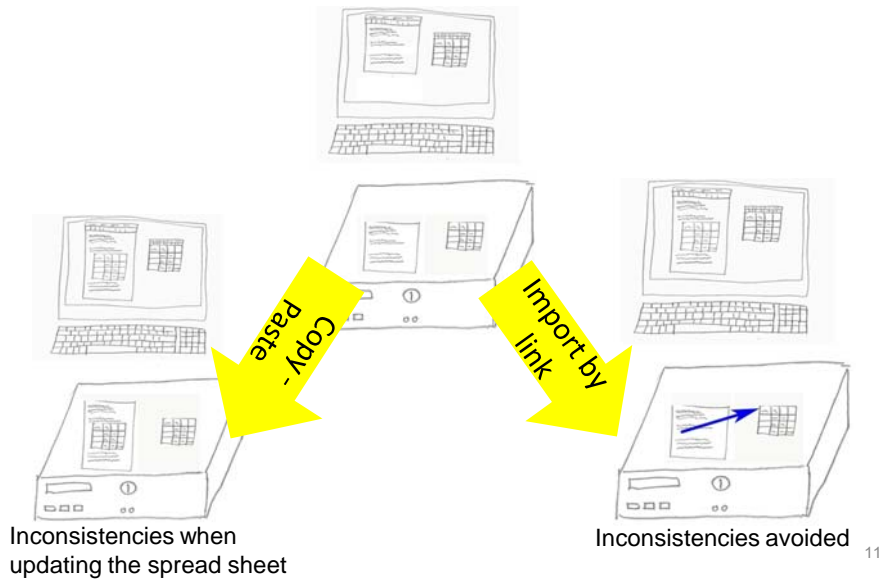
Ten golden rules for user learning

1. Organise training at the same time as the system is installed.
2. Provide users with detailed documentation during training.
3. Train users so that they understand IT concepts.
4. Train users so that they understand the usefulness of the IT.
5. Train users so that they can learn on their own.
6. Provide a variety of learning material.
7. Identify, organise, authorise and cultivate superusers.
8. Include IT, information and use competence.
9. Provide a variety of support channels and frequency.
10. Train local groups of users, not only individuals.

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