

Human-Computer Interaction

CPSC 481 - Winter 2019

Lessons from The Design of Everyday Things
II

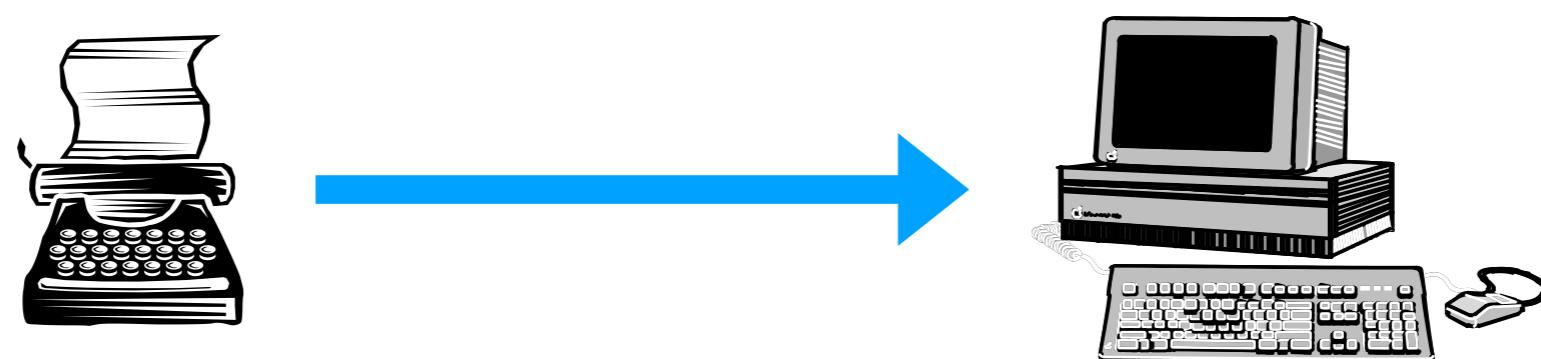
Adapted from Tony Tang

Learning Objectives

- By the end of the lecture, you should be able to:
 - Distinguish between positive and negative transfer effects
 - Describe the role of interface idioms has with regard to interface innovation
 - Discuss how cultural associations impact interface idiom design
 - Identify components that contribute to conceptual models
 - Distinguish between conceptual models and conceptual design
 - Distinguish between {design | system | user} model, and describe why mismatches cause problems

Transfer Effects

- People transfer their learning/expectations of similar objects to current objects
 - **Positive transfer:** previous learnings applied to new situation
 - **Negative transfer:** previous learnings conflicts with the new situation



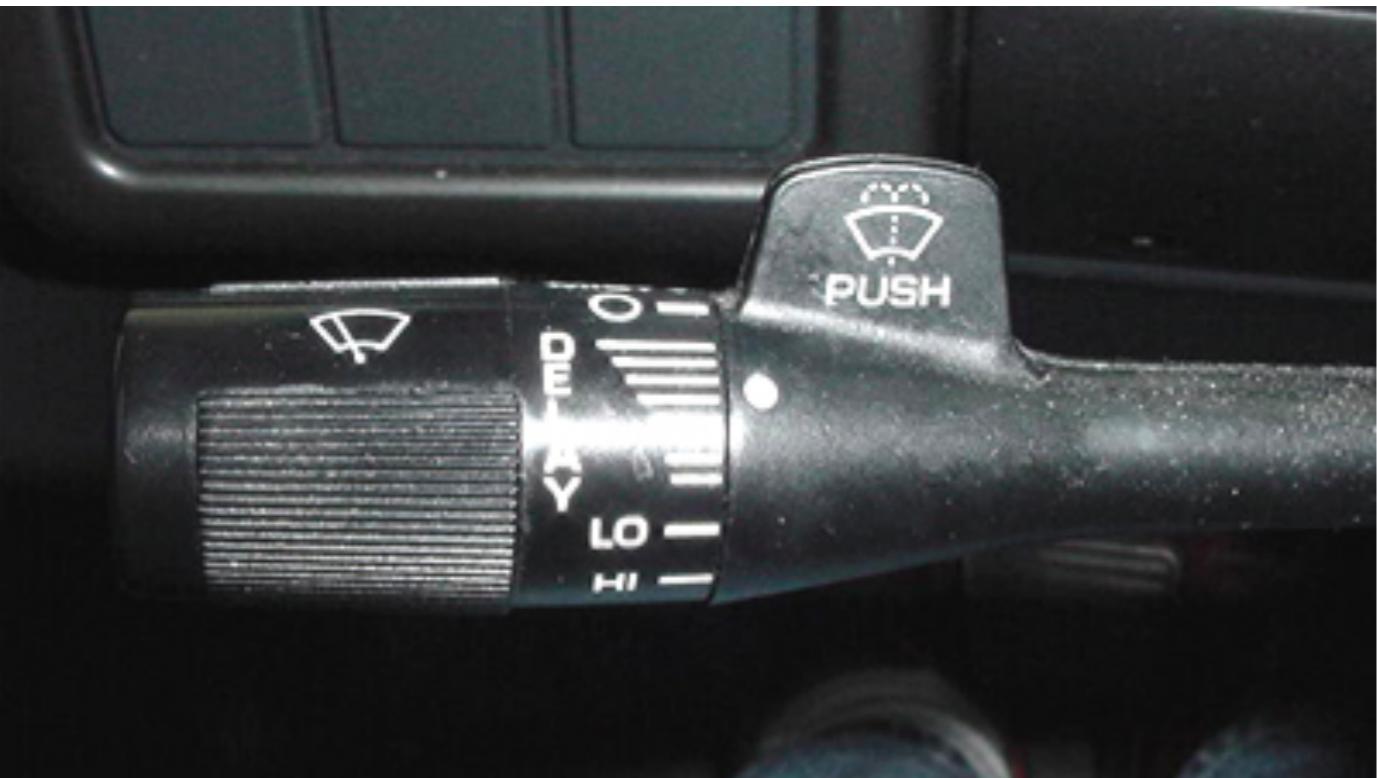
Transfer Effects in Real Life...



Transfer Effects in Real Life...



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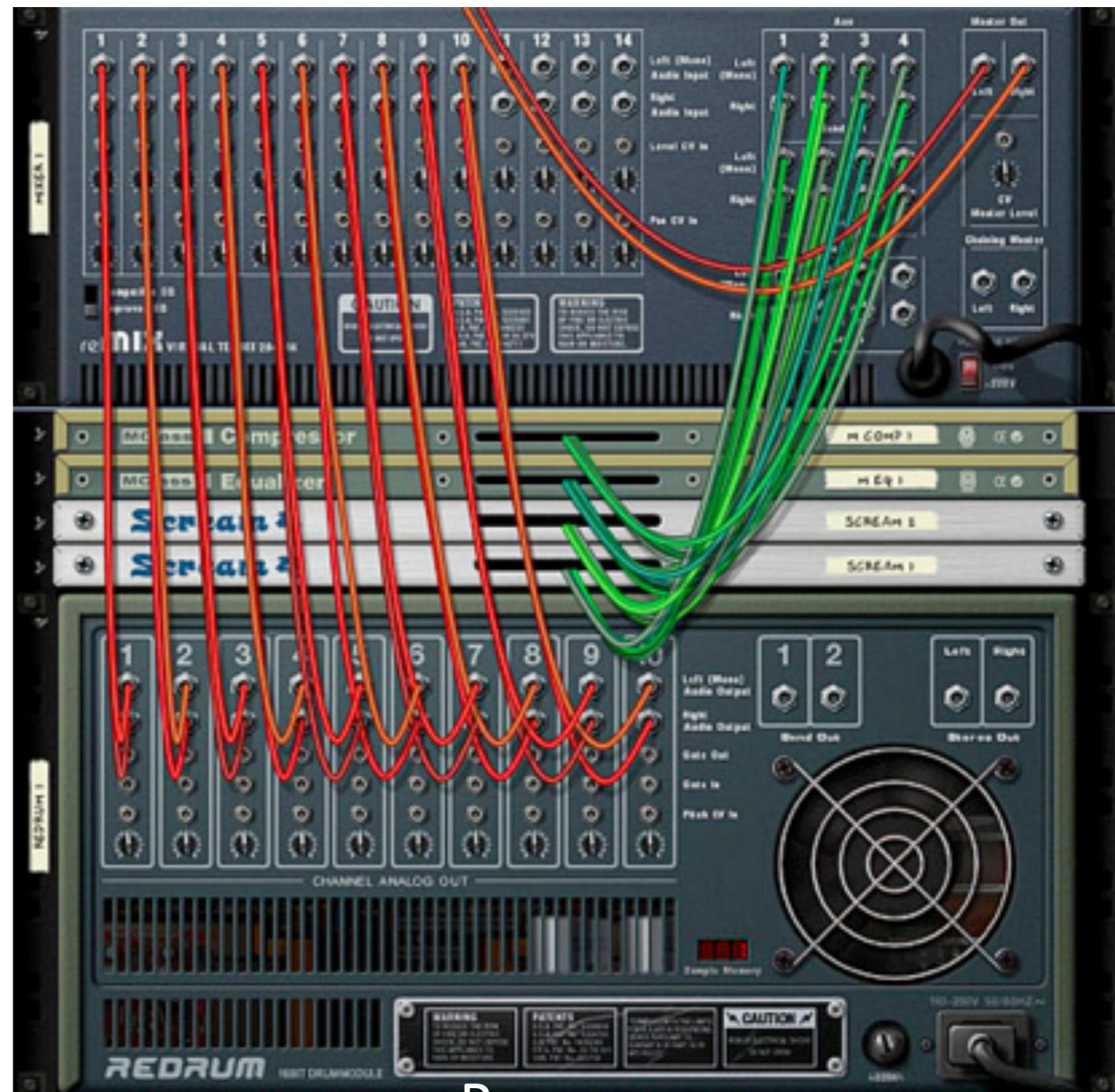
Transfer Effects in Real Life...



Transfer Effects for GUIs

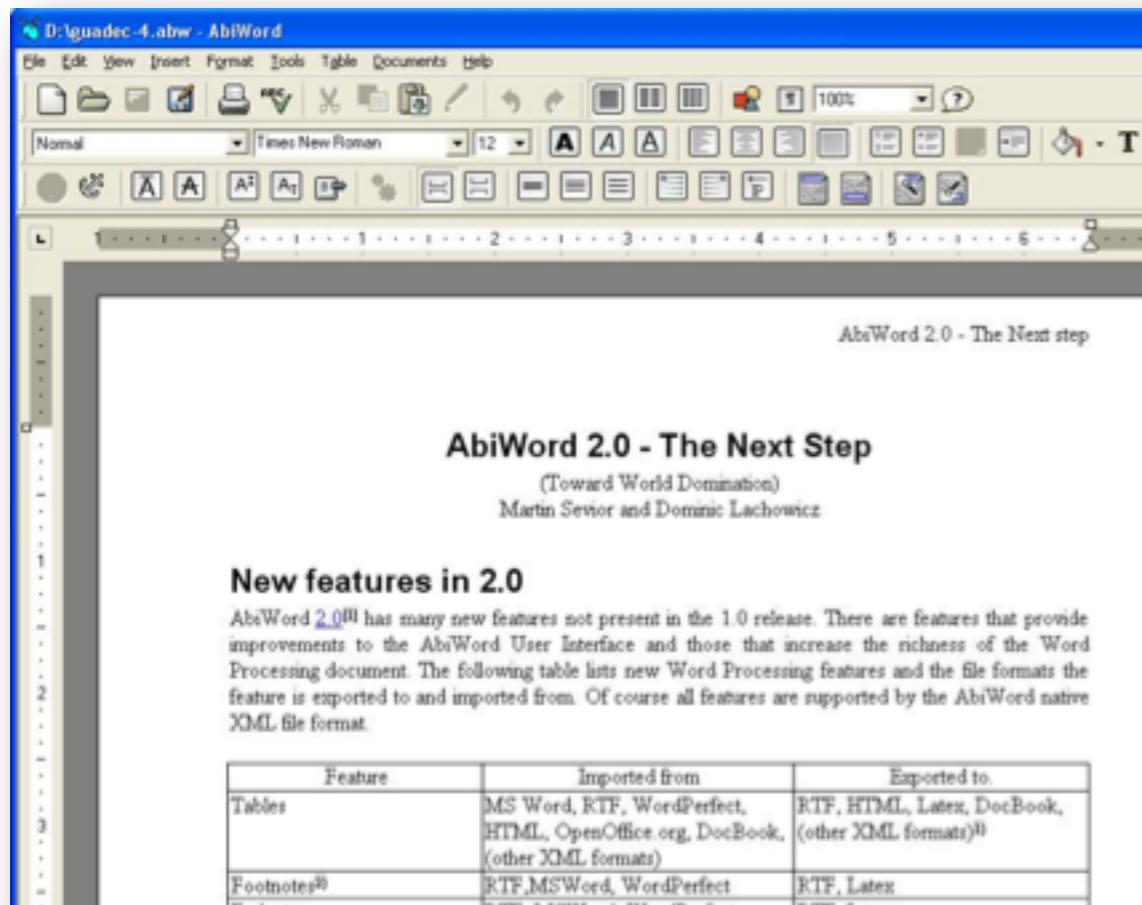


Real life



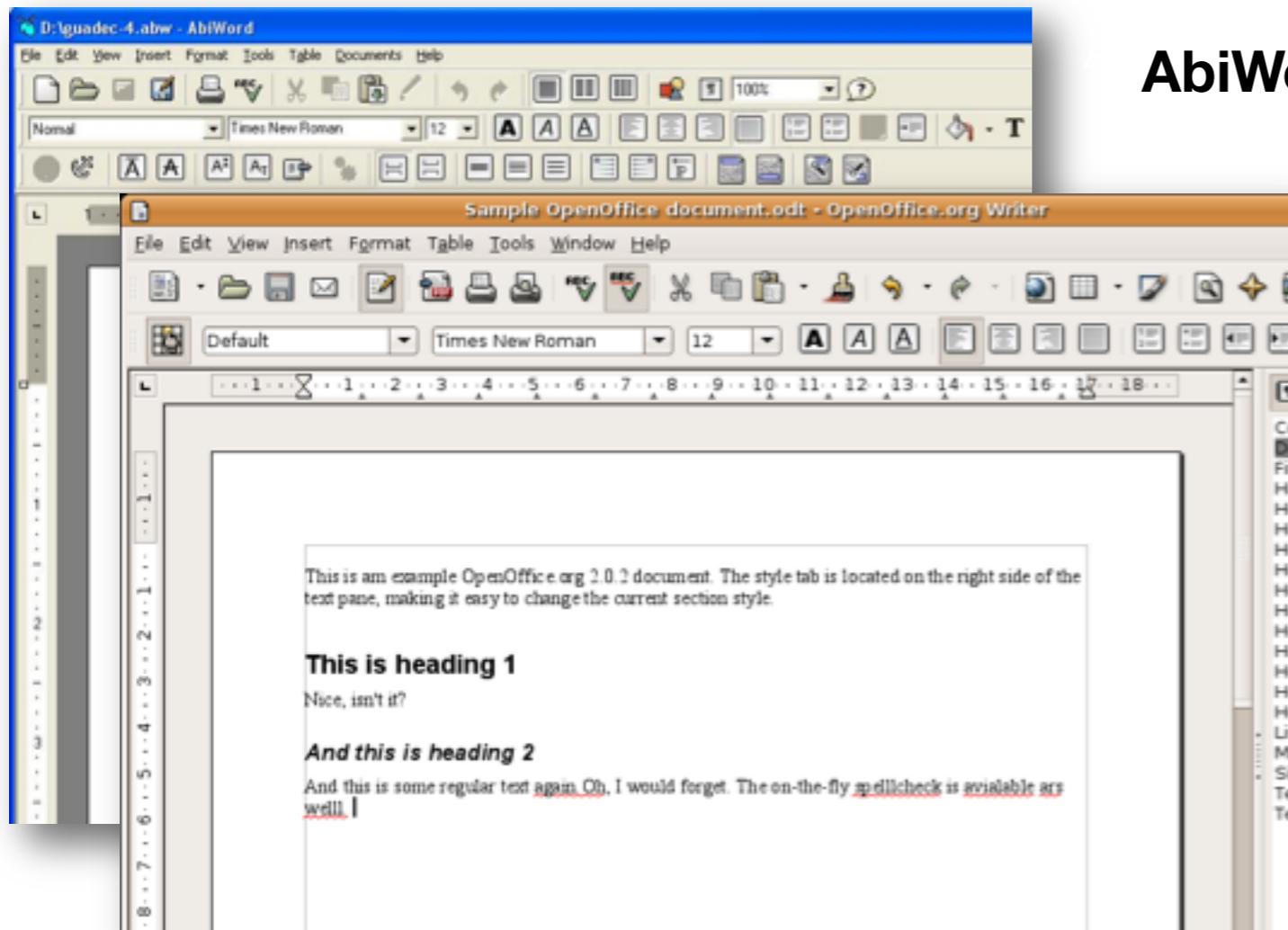
Reason

Transfer Effects for GUIs



AbiWord

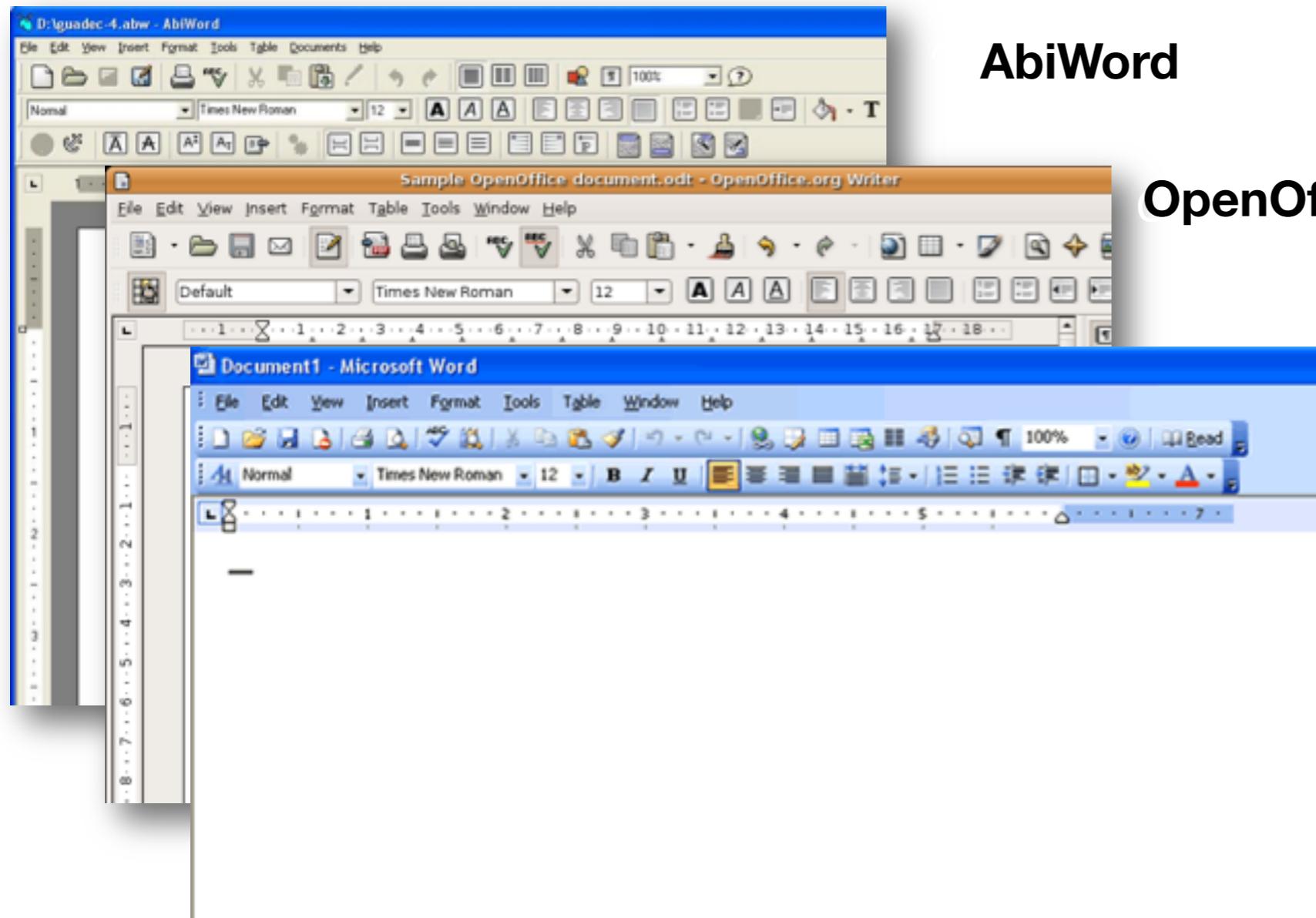
Transfer Effects for GUIs



AbiWord

OpenOffice

Transfer Effects for GUIs

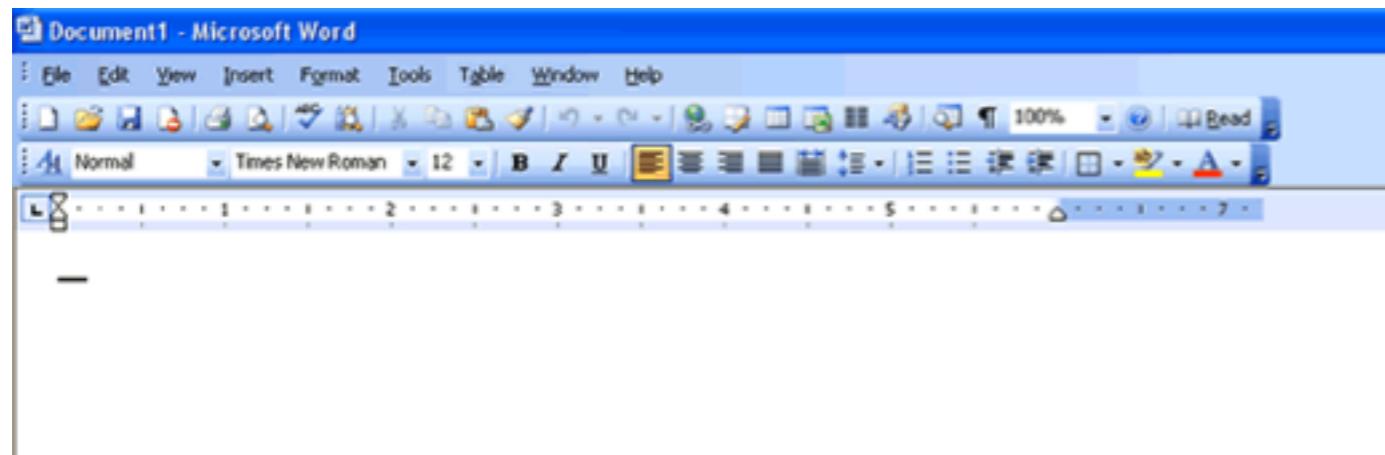


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OpenOffice

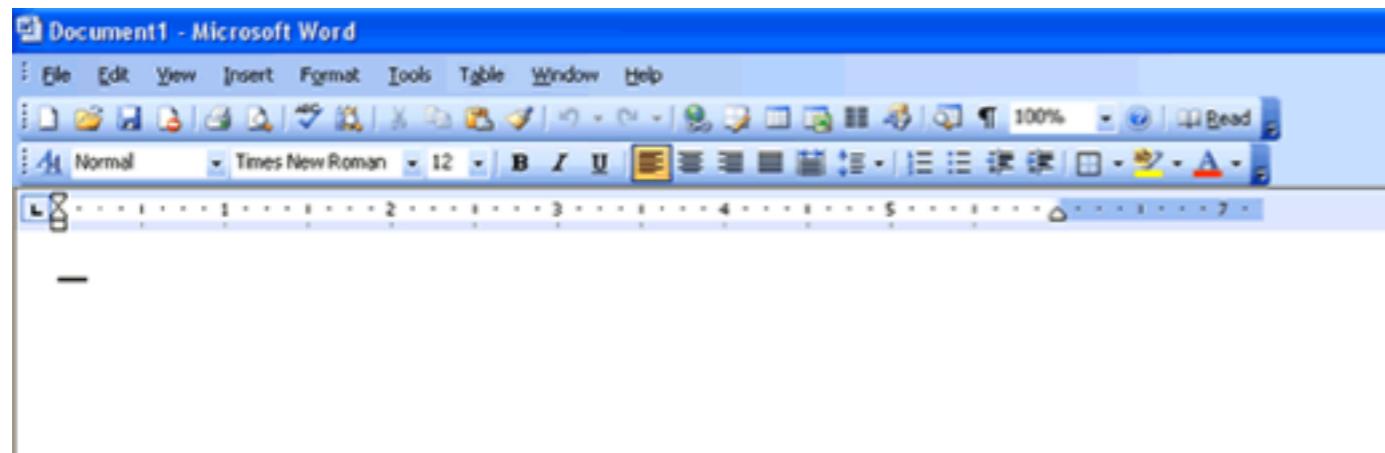
MS Word

Transfer Effects in GUI

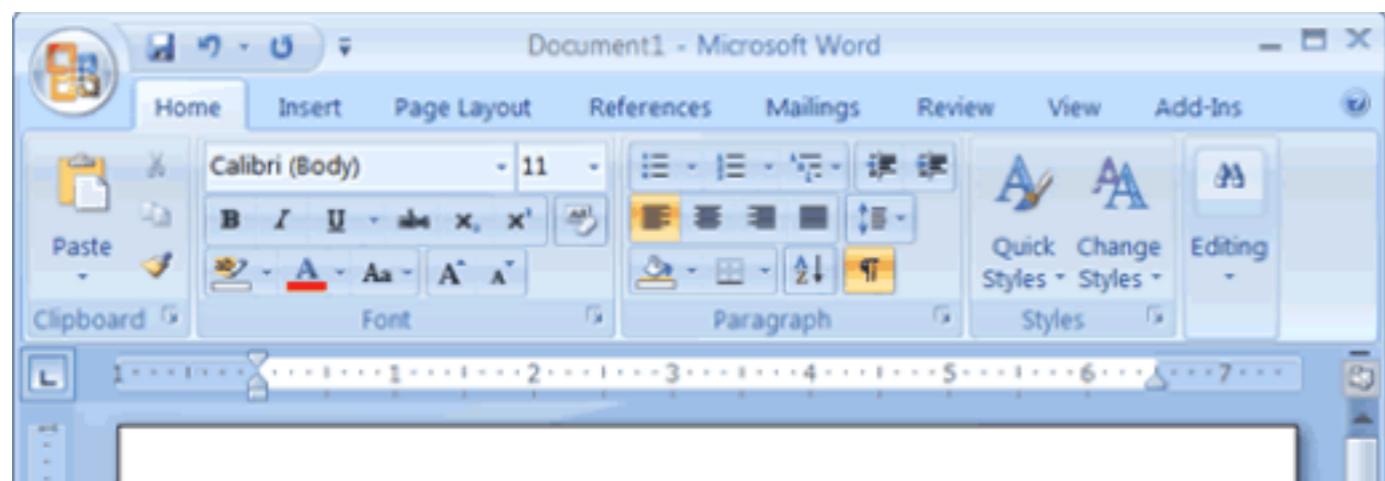


MS Word 2003

Transfer Effects in GUI

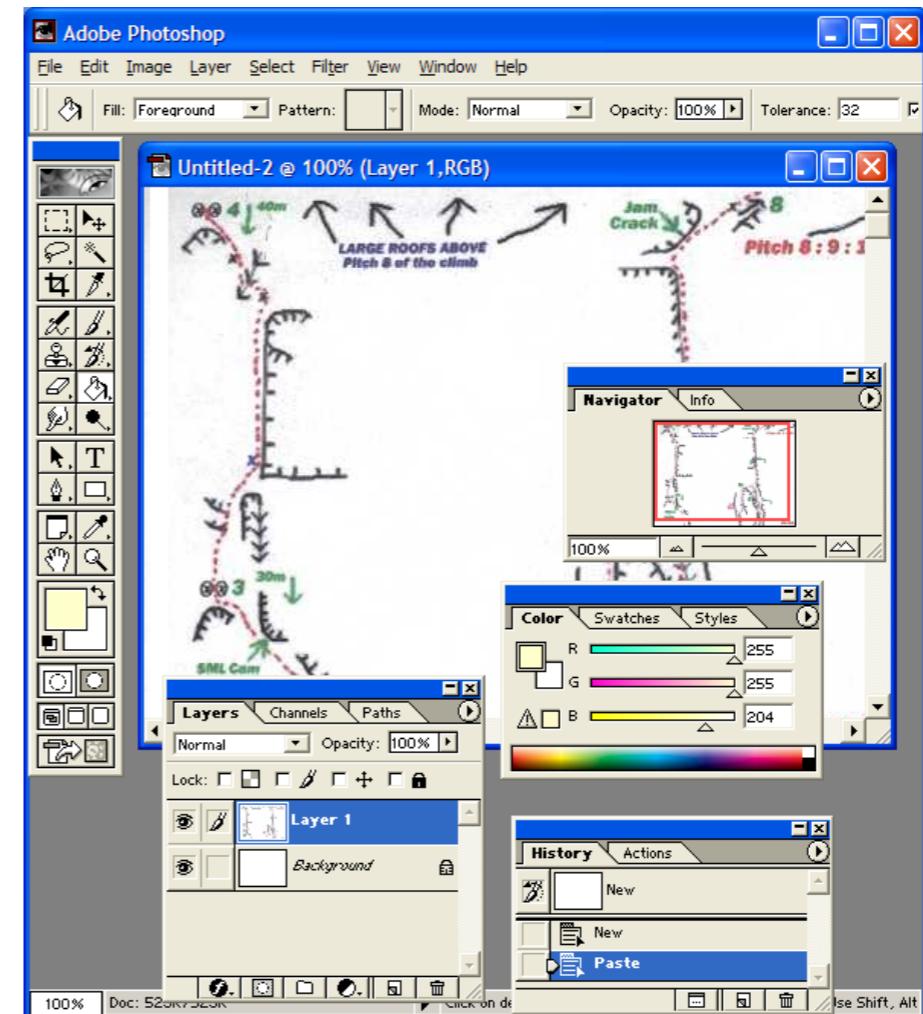
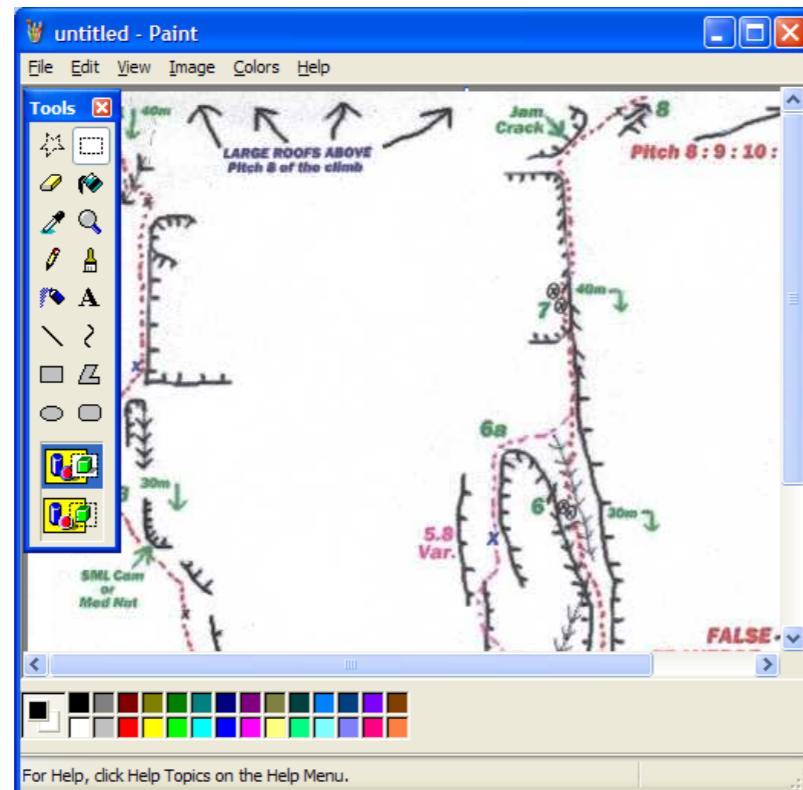


MS Word 2003



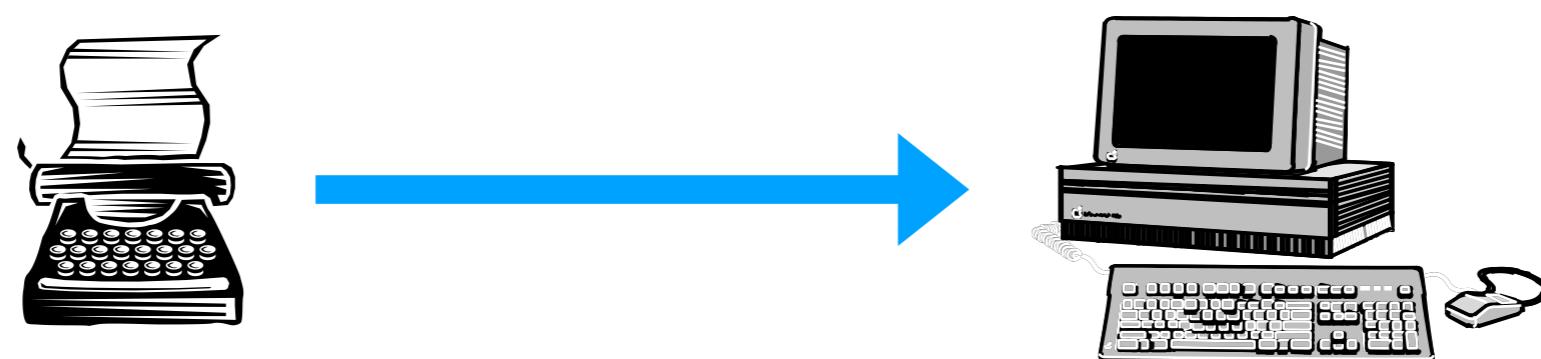
MS Word 2007

Transfer Effects in GUILs



Transfer Effects

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Idioms and Population Stereotypes

Idioms and Population Stereotypes

- **Interface idioms:**

- 'standard' interface features we learnt, use and remember

- **Idioms may define arbitrary behaviours**

- Red means danger
 - Green means safe



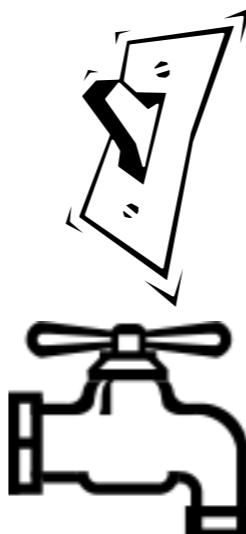
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Idioms and Population Stereotypes

- **Interface idioms:**
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- **Population stereotypes: idioms vary in different cultures**
 - Light switches
 - America: down is off
 - Britain: down is on
 - Faucets
 - America: anti-clockwise on
 - Britain: anti-clockwise off



Idioms and Population Stereotypes

- Ignoring/changing idioms?
 - Home handyman
 - Light switches installed upside down
- Calculators vs. Phone number pads
 - Which did computer keypads follow and why?

Idioms and Population Stereotypes

- Difficulty of changing stereotypes
 - Qwerty keyboard: designed to prevent jamming of keyboard
 - Dvorak keyboard ('30s): probably faster to use



Cultural associations



**Sun found their email icon
problematic for some
American urban dwellers
who are unfamiliar with rural
mail boxes.**



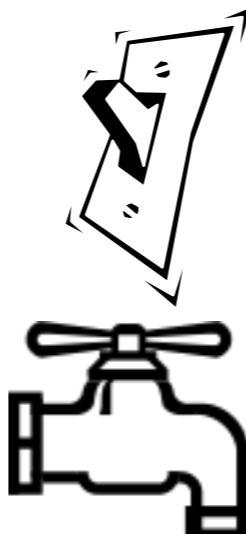


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Conceptual Models

- People have **mental** (or **conceptual**) **models** of how things work
- What do we construct these models from?
 - Affordances
 - Causality
 - Constraints
 - Mappings
 - Positive Transfer
 - Population stereotypes/cultural standards
 - Instructions
 - Interactions (including with other people)

Conceptual Models

- Models may be wrong, especially if attributes are misleading
- Models allow us to mentally simulate device operation
- Designers only have control over the **system image**



Our conceptual model of a bike isn't as good as we think it is, but it's good enough to recognise this as a bike!

Conceptual models of simple machines

- **Affordances**
 - Holes for something to be inserted
- **Constraints**
 - Big hole for several fingers, small hole for thumb
- **Mapping**
 - Holes-for-fingers suggested / constrained by appearance
- **Positive transfer & cultural idioms**
 - Learned when young; constant mechanism
- **Conceptual model**
 - Physical object implies how the operating parts work



Conceptual models of simple machines

- **Affordances**
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- **Positive transfer & cultural idioms**



A reasonable conceptual model can be formed by just looking at, and perhaps holding the object.

- you don't understand everything, but do some things anyway: why big blade down?
- model's not perfect: what about the “glide” style of cutting?

Conceptual models of more complex devices

- **Affordances**
 - Space to put your hand under it
 - Often stops before you are done, but how do you continue?
- **Constraints and mapping unknown**
 - How to control temperature? (you can't)
- **Transfer of training**
 - Weak / no transfer from manual faucet
- **Conceptual model**
 - Must be taught / learned; often varies between models



Conceptual models of more complex devices

- **Affordances**
 - Four buttons to push, but not clear what they will do
- **Constraints and mapping unknown**
 - No visible relation between buttons, possible actions and end result
- **Transfer of training**
 - Little relation to analog watches
- **Cultural idioms**
 - Somewhat standardized core controls and functions, but still highly variable
- **Conceptual model**
 - Must be taught / learn (experiment and learn over time)



Conceptual Models

- “*In interacting with the environment, with others, and with the artefacts of technology, people form internal, mental models of themselves and of the things with which they are interacting.*
- *These models provide **predictive** and **explanatory** power for understanding the interaction.*”
 - Don Norman

Conceptual Model vs. Conceptual Design

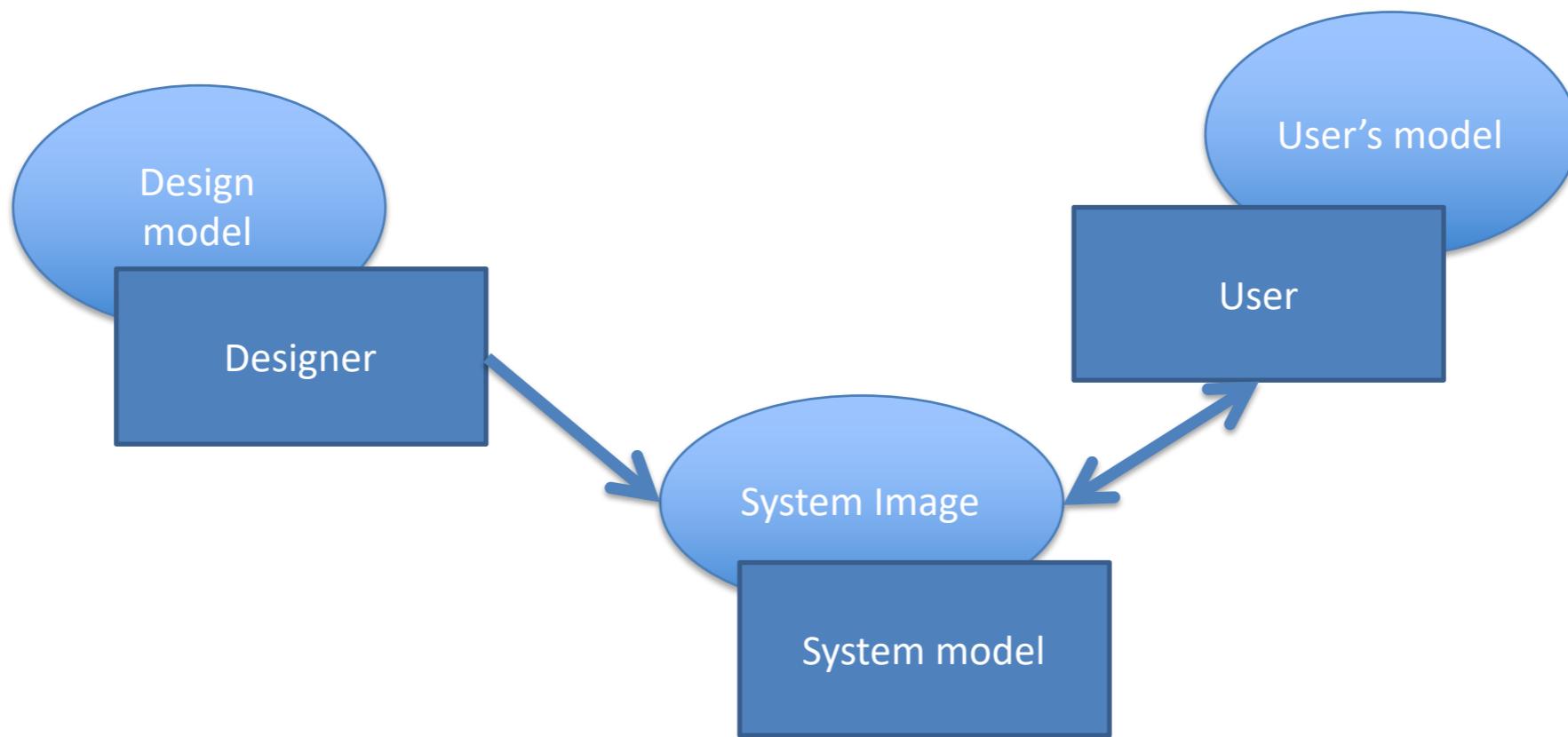
- **Conceptual Models:** something the **user** has (or forms)
 - Users see and understand the system through mental models
 - Users rely on mental models during usage

Conceptual Model vs. Conceptual Design

- **Conceptual Models:** something the **user** has (or forms)
 - Users see and understand the system through mental models
 - Users rely on mental models during usage
- **Conceptual Design:** something the **designer** does
 - Defining the **intended** mental model (hiding the technology of the system)
 - Defining a suitable **system image** (applying appropriate design guidelines)

Conceptual Design

- Designer's role is to provide a meaningful, useful system image a user's model matches the design model



Some models...

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Some models...

- **Design model**: what a designer intends to convey
- **System image**: what the user “sees” - the UI, documentation, labels etc.
- **User’s model (or conceptual or mental model)**: the user’s mental model developed by the user through interaction with the system
 - i.e. a belief system about the system

Lessons from the DOET

- You should now be able to:
 - Distinguish between positive and negative transfer effects
 - Describe the role interface idioms has with regard to interface innovation
 - Discuss how cultural associations impact interface idiom design
 - Identify components that contribute to conceptual models
 - Distinguish between conceptual models and conceptual design
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Acknowledgements

- Tony Tang
- Lora Oehlberg
- Ehud Sharlin
- Frank Maurer
- Saul Greenberg

Course information

- Website
 - GitHub Pages <https://silvadasilva.github.io/CPSC481-2019W/en/#!index.md>
- Communications
 - Slack <https://cpsc481-2019w.slack.com/>
- Readings and Slides
 - Posted online at the main website