

# User Interface Design

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# How to Read this Book

## Special symbols used in this document



### Bibliographic References:

- Quick references are included in the footer of the slides where the cited text appears.
  - Full bibliographic references are included at the end of the book in the Appendix C: *References*.



### Videos:

- All videos included in this multimedia presentation are available at the *Usability Bites's play list*.
  - You can play them at [www.youtube.com](http://www.youtube.com) from [www.martin-gonzalez.es](http://www.martin-gonzalez.es)

*Technological Terror*  
(Video [00:52])

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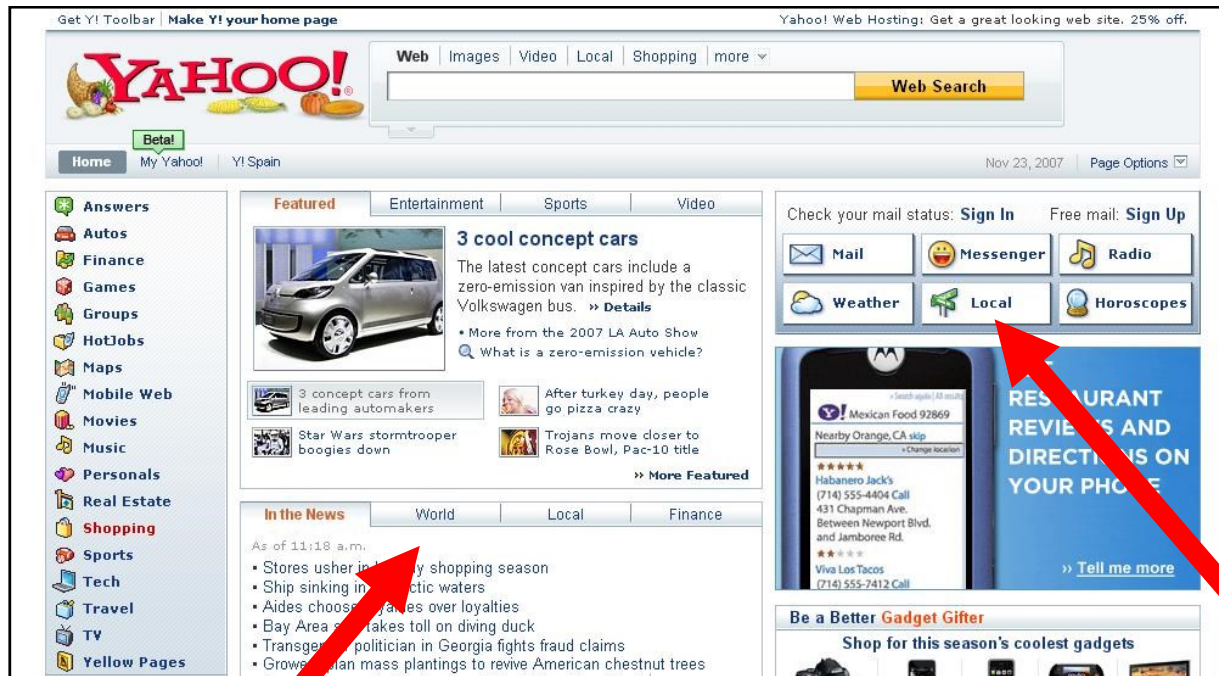
# The Conceptual Level

# The 4-Layer Design Architecture

## Conceptual Level

- ❖ Defines how the users think.

Navigation



[tabs] metaphors

Conceptual block analysis

# Conceptual Level

## Heavily influenced by Cultural Values

### ❖ Conservative Mental Models

- It is difficult to introduce changes in how people behave and interact.



Medieval Helpdesk (Video [02:39])

# Conceptual Level

Ask users to find out...but do it well<sup>1</sup>!

*“Would you like Walmart aisles to be less cluttered?”*



## Outcome

- Walmart removed 15% of inventory clearing aisles. It was a time-consuming and expensive task.
- Sales went down losing near **two billion dollars** in sales..
- Walmart spent more money returning its strategy of offering a cluttered inventory.

**Avoid the use of yes/no questions in your surveys**

<sup>1</sup>[www.goodexperience.com/blog/2011/04/ignore-the-customer-e.php](http://www.goodexperience.com/blog/2011/04/ignore-the-customer-e.php).

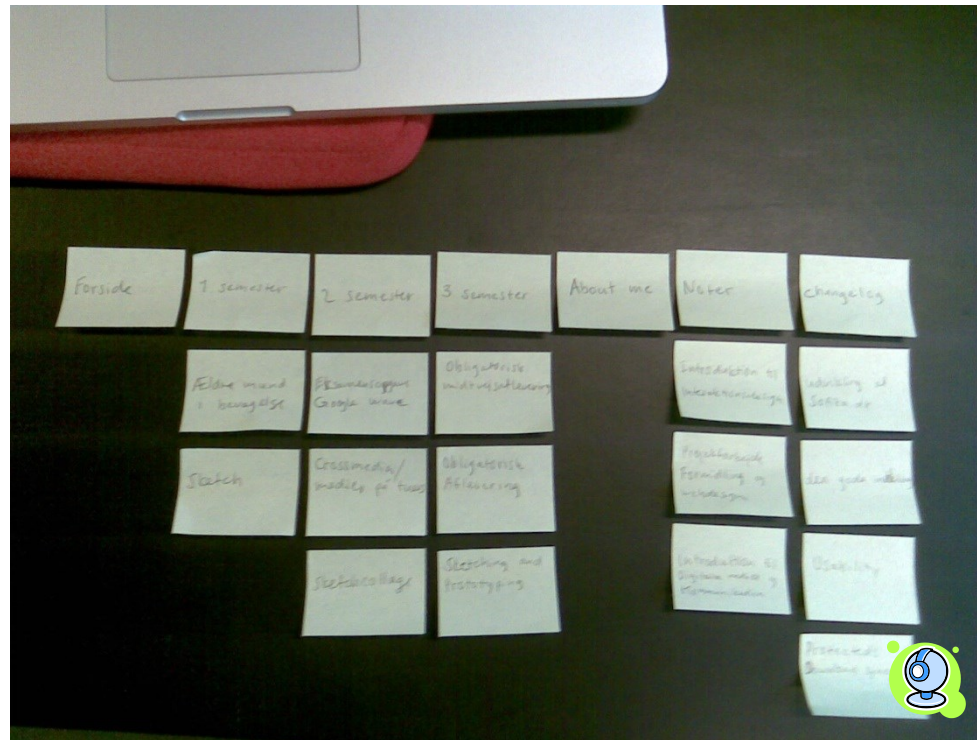




# Conceptual Level

## Card Sorting

- ❖ Users group a number of cards labeled with the different thematic categories of the site.



IVANIAN (2012) mariv.dk



# Card Sorting

## Card Sorting

- ❖ It is possible to organize and classify information of a web site according to the users' mental model.

### Requirements

- 1 usability expert (observer).
- 20+ *representative* users.

### When should it be used?

- Predesign.
- Design.

# Card Sorting

## Card Sorting Technique

- ❖ Sorting 40 cards requires about 20 minutes.

### The Technique

1. Participants should know that the criteria for grouping de cards into the categories is *similarity*.
2. Give users the cards with the different categories, making sure that the cards are disordered (shuffled).
3. In the '**closed card sorting**', the categories are predefined and labeled. Users only need to put each card in the appropriate group.
4. In the '**open card sorting**' users can freely include the categories in the number of sets they think necessary.
5. Create a **Similarity Matrix** from the information collected and process it by clustering (Cluster Analysis):
  - a) Hierarchical Clustering obtaining a **Dendogram**.
  - b) Multidimensional scaling (MDS) obtaining a **MDS Graphic**.

# Card Sorting

## Similarity Matrix

- ❖ For each pairing of two cards in the survey, a count is provided at the corresponding point in the matrix.

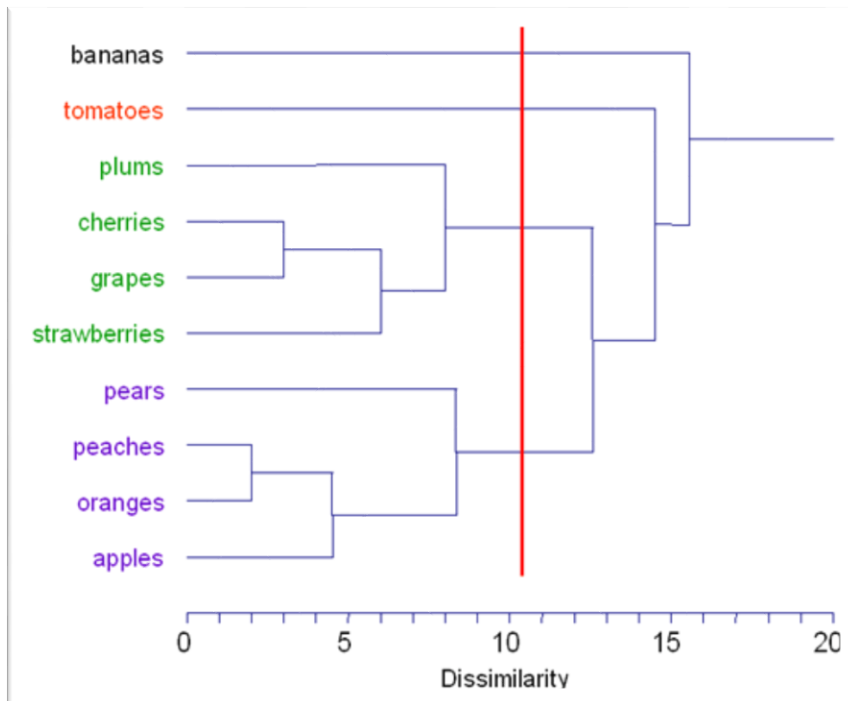
members									
1									partners
1	1								projects
1	1	1							conferences
1	1	1	1						courses
1	1	1	1	1					programs
1	1	1	1	1	1				publications
1	1	1	1	1	1	1			awards
									vadinia
						1			dstool
						1	1		spearhead
						1	1	1	cinemedia
						1	1	1	tirsus x
									Contact
								1	join us
									Sitemap
								1	Accessibility
									Home
								1	Login

- ❖ The count describes how many times the two cards were placed in the same category by all participants

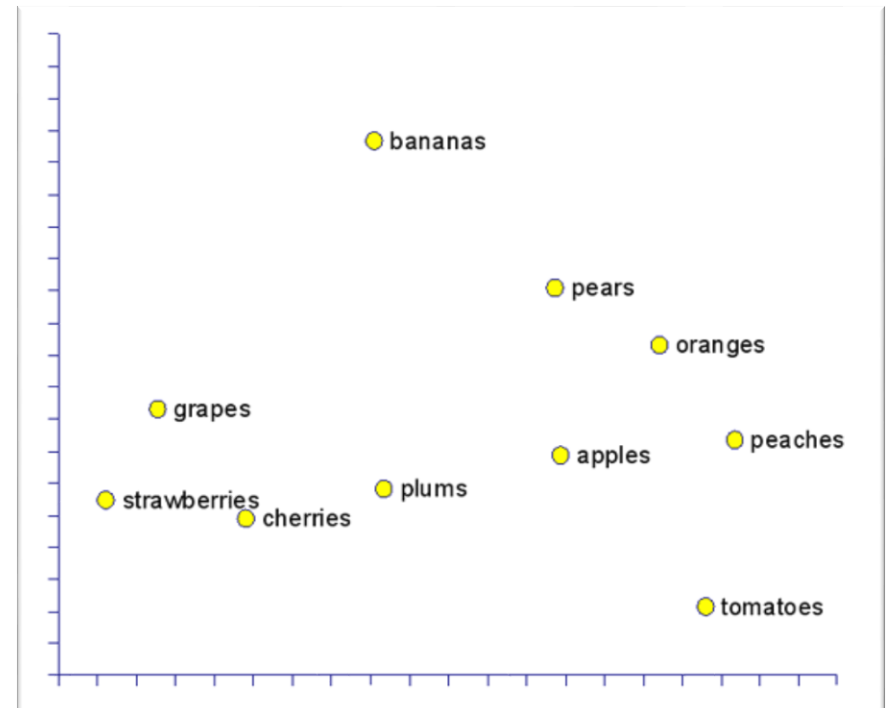
# Card Sorting

## Cluster Analysis

- ❖ Group observations into clusters so that elements in the same cluster are similar in some sense



Dendrogram



MDS

Card Sorting Tools (2012) measuringuserexperience.com

# Card Sorting

## Software Tools

- ❖ Automates the statistical processing on the collected data
  - Web-based applications allow remote card sorting and large number of participants.

Uzilla   
uzCardSort

**OptimalSort**   
Improve the organisation of your site

 xSort

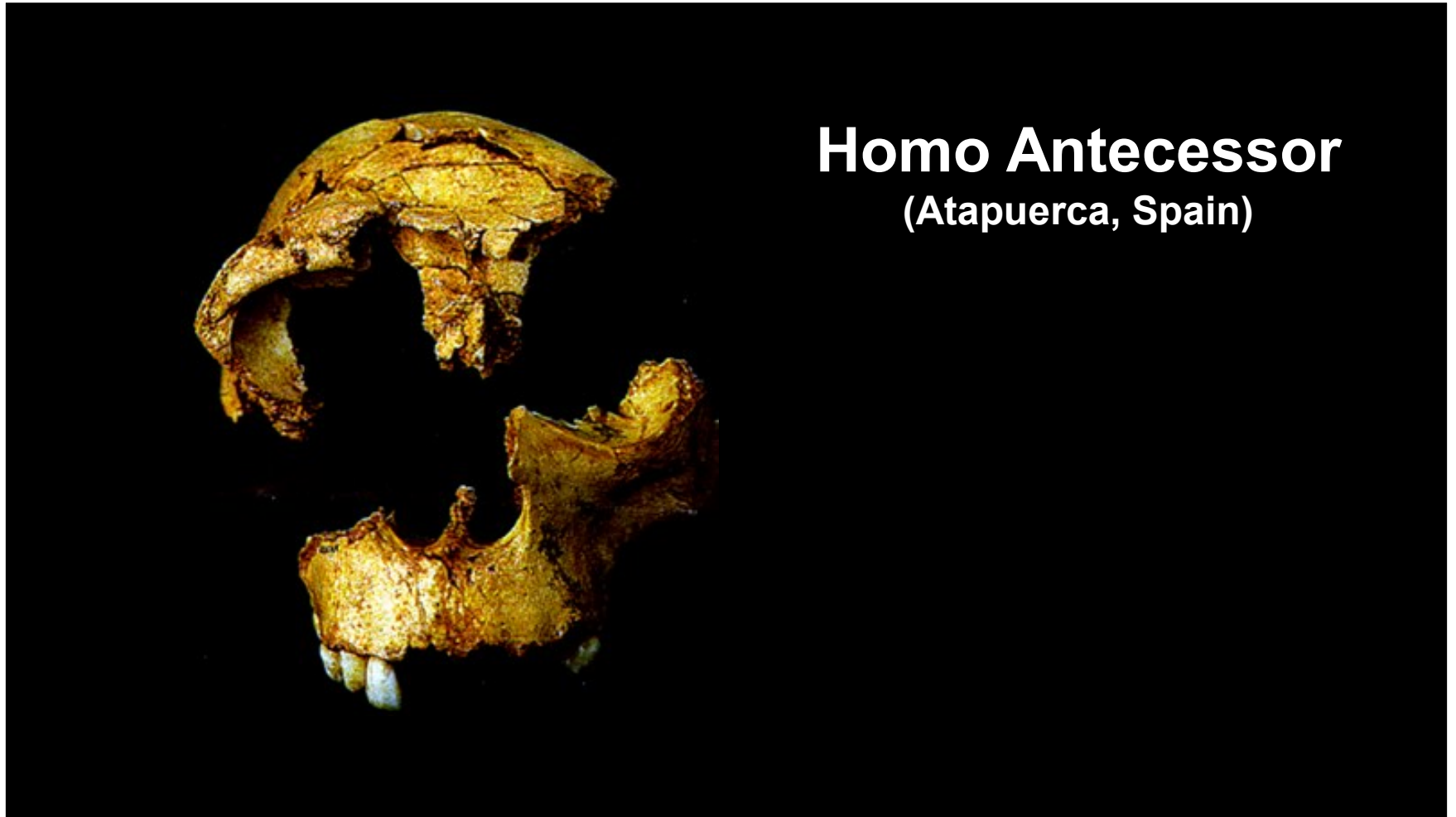
web 

  
**userzoom**  
zooming in on the user experience



# Mental Models

850.000 years Before Present



**Homo Antecessor**  
(Atapuerca, Spain)

# Mental Models

## Development Lifecycle Invented



**Analysis & Design**



**Implementation**



**Testing**



**Scrape**



**Bore**



**Sharpen**



# Mental Models

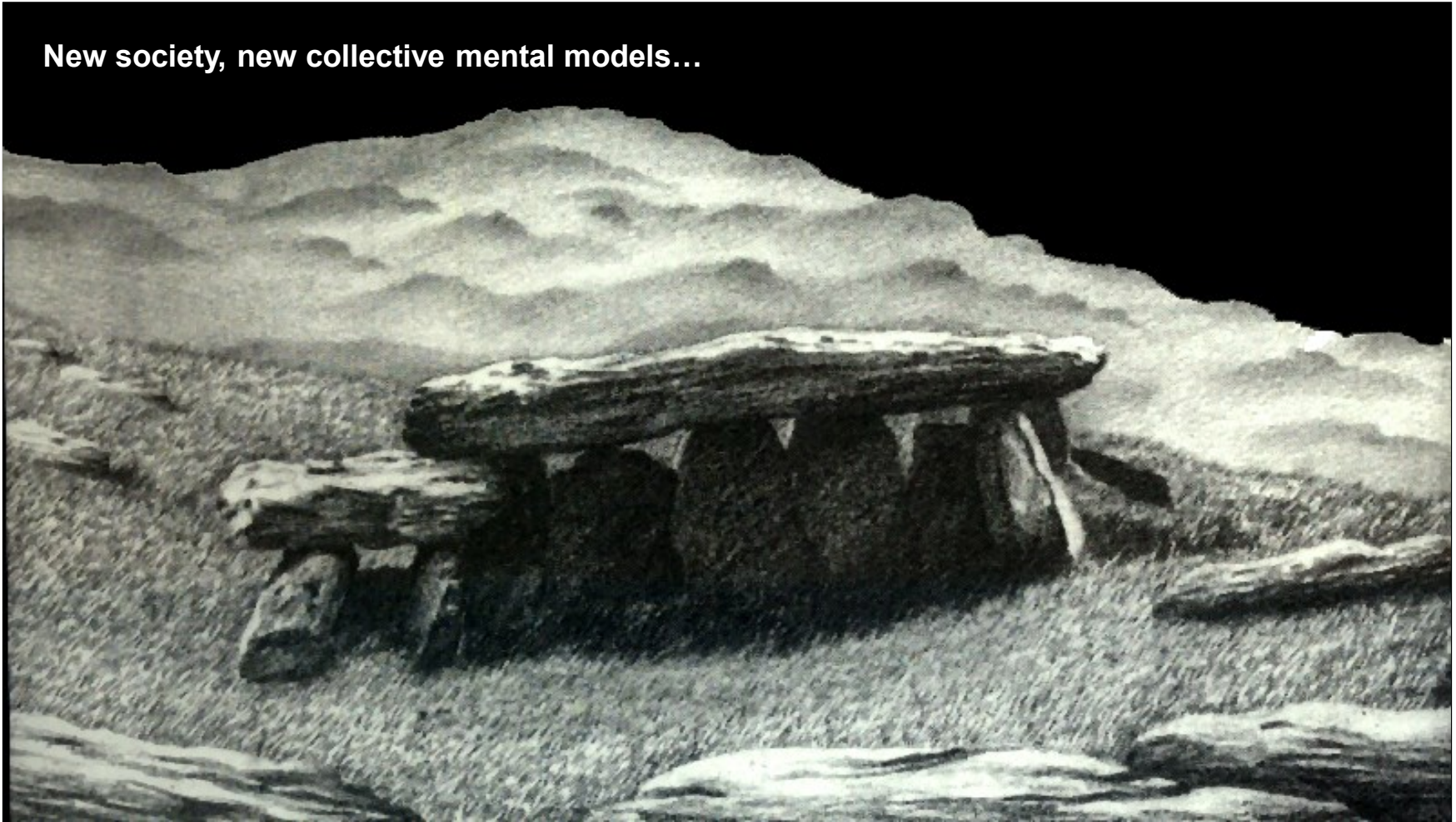
## Society Evolves towards the first Civilizations



# Mental Models

## Neolithic (circa 5.000 B. C.)

New society, new collective mental models...



**QUIZ: What were Dolmens used for?**

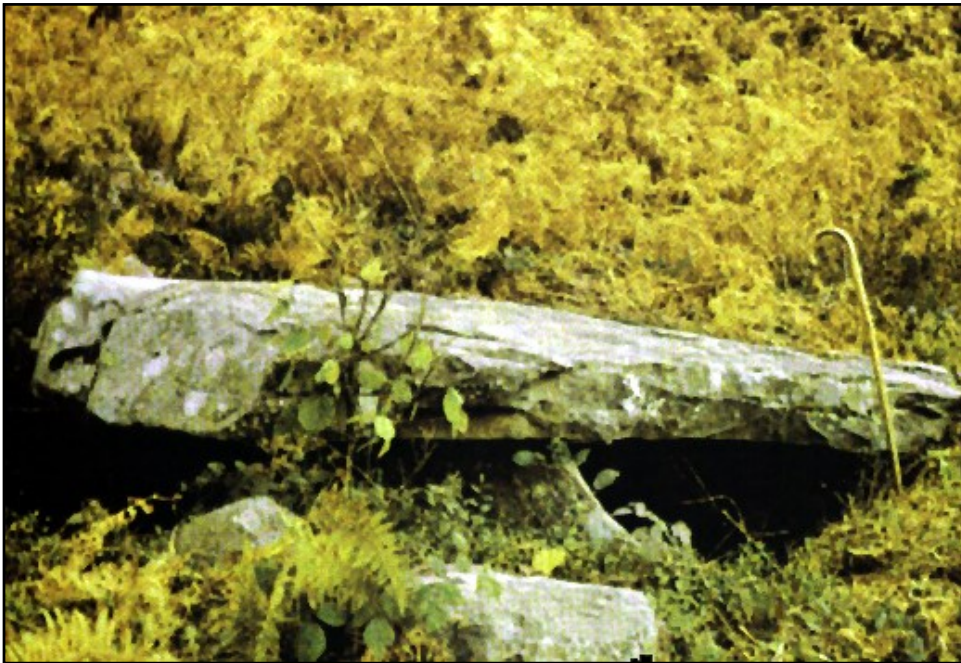
[17] Mar-16



# Mental Models

## Cult of Death

- ❖ Burials are one of the most important social ceremonies.

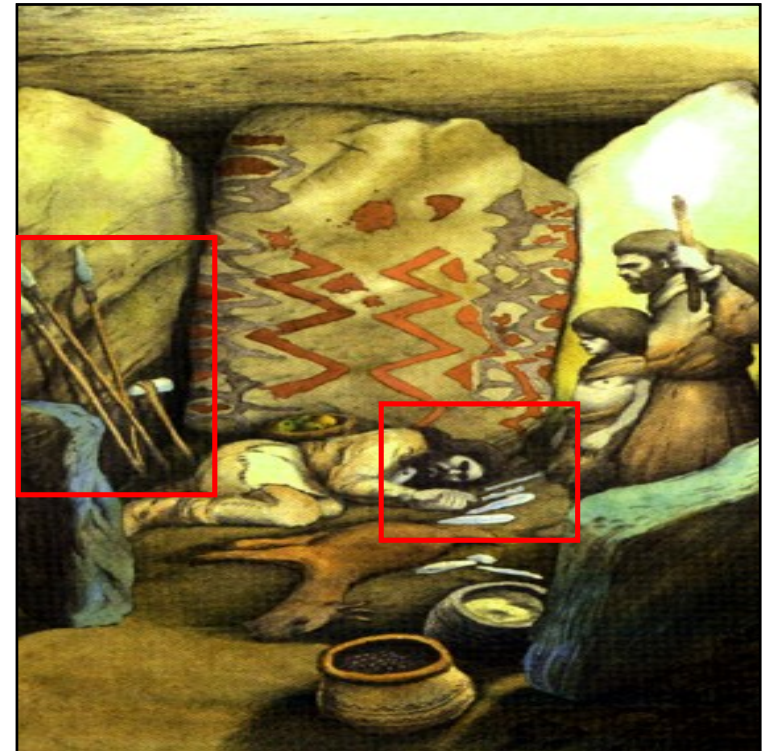


Klossowski, Tomasz; (2006) [www.morgefile.com](http://www.morgefile.com)

# Mental Models

## The most Important Ceremony!

- ❖ Society was based on strong hierarchies.
  - Our beloved Leader is being buried.



# Mental Models

## First Metaphors

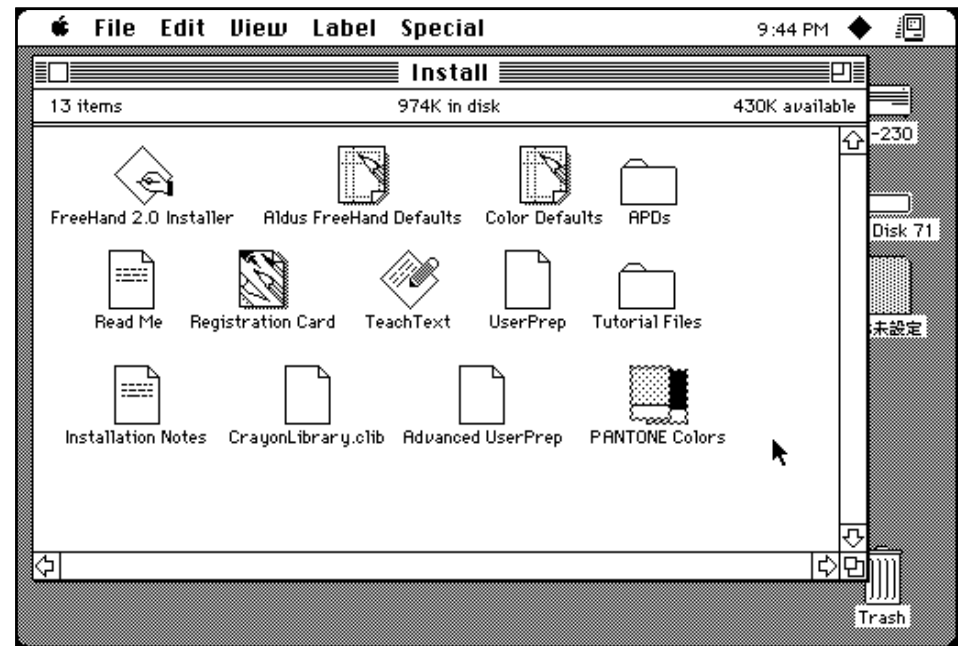




# Desktop-based Metaphors

## Desktop-based Metaphors

- ❖ Emulates a real office using an abstract representation.



Apple Macintosh, circa 1984

# Desktop-based Metaphors

## Desktop-based Metaphors

- ❖ Metaphor didn't change since its introduction.
  - Only cosmetic changes have been introduced to its representation.



Apple Macintosh, circa 2007



BumpTop Hip Hop (Video [00:19])

BumpTop 3D Desktop Prototype (Video [06:49])



# Desktop-based Metaphors

## Bad Designed Desktop-based Metaphors

- ❖ Metaphors must match user's mental model!

Infinite recursion!  
(a computer inside a computer)

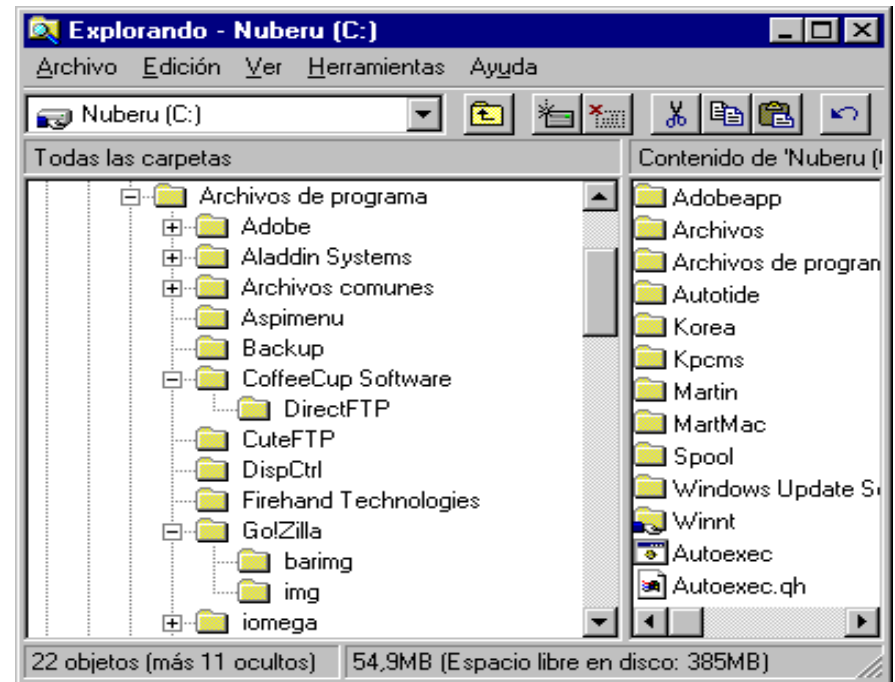
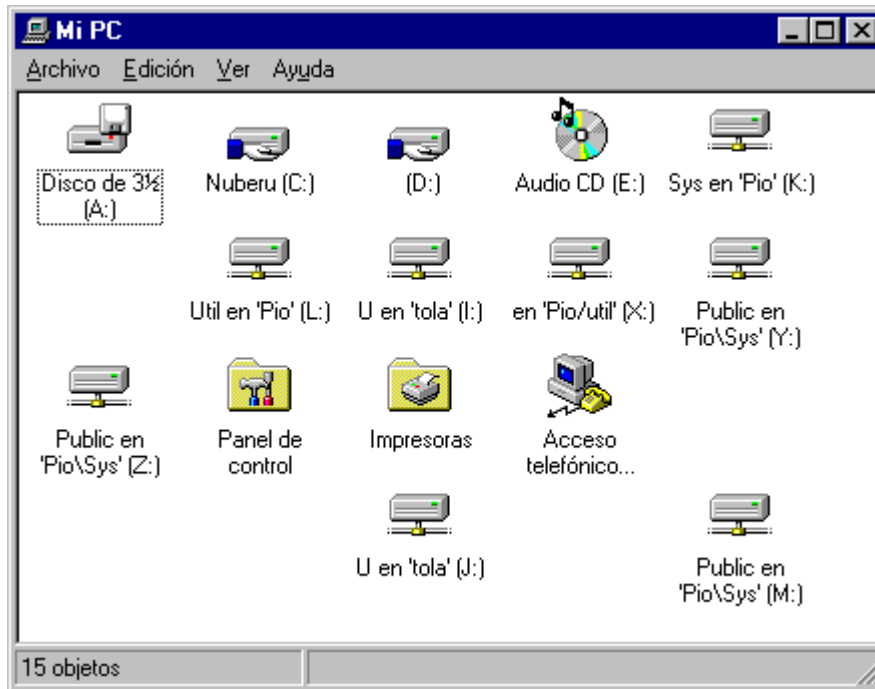


Recycling bytes is a programmer's concept, not a user's concept!

# Desktop-based Metaphors

## Bad Designed Desktop-based Metaphors

- ❖ Users usually don't have hard disks on their tables in the real world 😊.



Infinite file hierarchy (recursion) represents Usability Problem for elderly users

# Newspaper Metaphors

www.telegraph.co.uk

RSS | Britain's No.1 quality newspaper website | Make us your homepage Saturday 8 December 2007

# Telegraph.co.uk

**BEST CONSUMER ONLINE PUBLISHER**  
aop.uk

WELCOME TO **EARTH**  
The defining issues of our time  
Telegraph.co.uk/earth

Home News Sport Business Travel Jobs Motoring Telegraph TV SEARCH  Go  Our site  Web

Arts  
Christmas  
Digital Life  
Earth  
Education  
Expat  
Family  
Fashion  
Features  
Food & Drink  
Football  
Gardening  
Health  
Property  
Science  
Weather  
Your Money  
  
Blogs  
Comment  
My Telegraph



**TV LIVE NEWS NOW** ▶ PLAY VIDEO

## Detectives charge 'dead' canoeist

Police charge John Darwin with two offences and urge his wife to contact them.

**4 million still in debt from last Christmas**  
**Afghanistan battle leaves at least 12 dead**  
**Doris Lessing warns of 'inanity' of internet**

**NEWS**  
**Guantanamo answers**  
Tories demand to know if detainees are "dangerous".  
**Kieren Fallon 'fails drug test'**  
**Paddington Bear arrested**

**SPORT**  
**United close the gap**  
Champions beat Derby 4-1 to move point off the top.  
**Hatton needs perfection**  
**Hoggard out of second Test**

**BUSINESS**  
**£116m price-fixing fine**  
Leading supermarkets and dairy groups admit guilt.  
**Shareholders back Rock bid**  
**Rap stars drive Cognac boom**

**TELEGRAPH COMMENT**

**Simon Heffer: Will Gordon Brown admit his errors?**

**Charles Moore: BBC will not screen Mohammed film**

**Lionel Shriver: Hillary Clinton entitled to nothing**




Award winning offshore banking for people living and working abroad

▶ Click here to find out more

**MATT** 

**Alex** 

Make us laugh 

**TELEGRAPH TV & TALK**



**▶ PLAY VIDEO**

- Fallon fails drug test**
- Brown snubs summit**
- Omaha killing CCTV**
- TV News Now**



Daily Telegraph; (2007) www.telegraph.co.uk

Online newspaper web sites seem to be carbon copies of their printed versions



# Advert Metaphors

www.mediamarkt.com

The screenshot shows the MediaMarkt website homepage. At the top left is the MediaMarkt logo with the tagline "Ich bin doch nicht blöd." To the right is a banner for "DAS KAUF ICH EUCH AB" (I buy it for you) featuring a man's face and listing "Angebote, Spots, E-CARDS". Below this is a navigation bar with categories: Home, Audio, Video & TV, Car HiFi, Computer, Foto & Camcorder, Handys & Büro, Haushalt, and Musik, Film & Games.

The main content area features a large advertisement for "Schenken Sie Musik." (Gift Music) with an iTunes gift card. Below this is a section for "Heimkino mit HD DVD" (Home Cinema with HD DVD) showing a DVD disc. On the right side, there is a large, tilted promotional graphic for a PlayStation 3 console, priced at 599.99, with various features listed like "Jetzt vorbestellen" (order now) and "Nur wer jetzt vorbestellt, bekommt im November die PlayStation 3".

On the left side, there are several sidebar elements: "Ab zu Ihrem nächsten MediaMarkt." (Up to your next MediaMarkt.), a "Newsletter" sign-up, "Mobile Tour", "Genuss deLuxe", and "Mehr Service" (More Service) which includes "Service-Angebot", "Plus Garantie", "Lexikon", and "Geschenkkarte".

Mediamarkt; (2007) www.mediamarkt.com

Online superstore's web sites try to resemble their printed product catalogs

Do you match the differences?

# Shopping Cart Metaphors

www.amazon.com

amazon.com Hello. Sign in to get [personalized recommendations](#). New customer? [Start here](#).

Want it by Dec. 24?

10 days left to order   
using **FREE Super Saver Shipping**  
[Restrictions Apply](#)

Your Amazon.com Today's Deals  Gifts & Wish Lists  Gift Cards  Your Account | Help

Shop All Departments  Search Amazon.com GO Cart Your Lists

**Get the Amazon.com Visa® Card INSTANTLY and Get \$30 Back**

Your current subtotal: \$18.15 [Get \\$30 back](#)

Amazon.com Visa savings: **-\$30.00**  
Small business owners and students may prefer:  
[Amazon.com Business Visa Card](#)  
[Amazon.com Student Visa Card](#)

Your cost after savings: **\$0.00**

Savings remaining: **\$11.85**

**READY TO ORDER?**

Wait! Add **\$6.85** to your order to qualify for **FREE Super Saver Shipping**.  
[See details](#)

[Proceed to Checkout](#)

Sign in to turn on 1-Click ordering.

Show gift options during checkout

Shopping Cart  Already a customer? [Sign in](#)

[See more items like those in your cart](#)

subtotal = **\$18.15**  
Make any changes below? [Update](#)

**Shopping Cart Items--To Buy Now**

	Price:	Qty:
Item added on December 8, 2007 <a href="#">The Design of Future Things</a> - Donald A. Norman; <b>Hardcover</b> In Stock <a href="#">Save for later</a> <a href="#">Delete</a> <input checked="" type="checkbox"/> Eligible for FREE Super Saver Shipping <input type="checkbox"/> <a href="#">Add gift-wrap/note</a> <input type="checkbox"/> <a href="#">(Learn more)</a>	<b>\$18.15</b> You Save: \$9.35 (34%)	<input type="text" value="1"/>

**Recently Viewed Items:**

- [The Design of Future Things](#) by Donald A. Norman  
Kindle: [Amazon's New Wireless Reading Device](#) by Amazon
- [Acts of Meaning: Four Lectures on Mind and Culture](#)

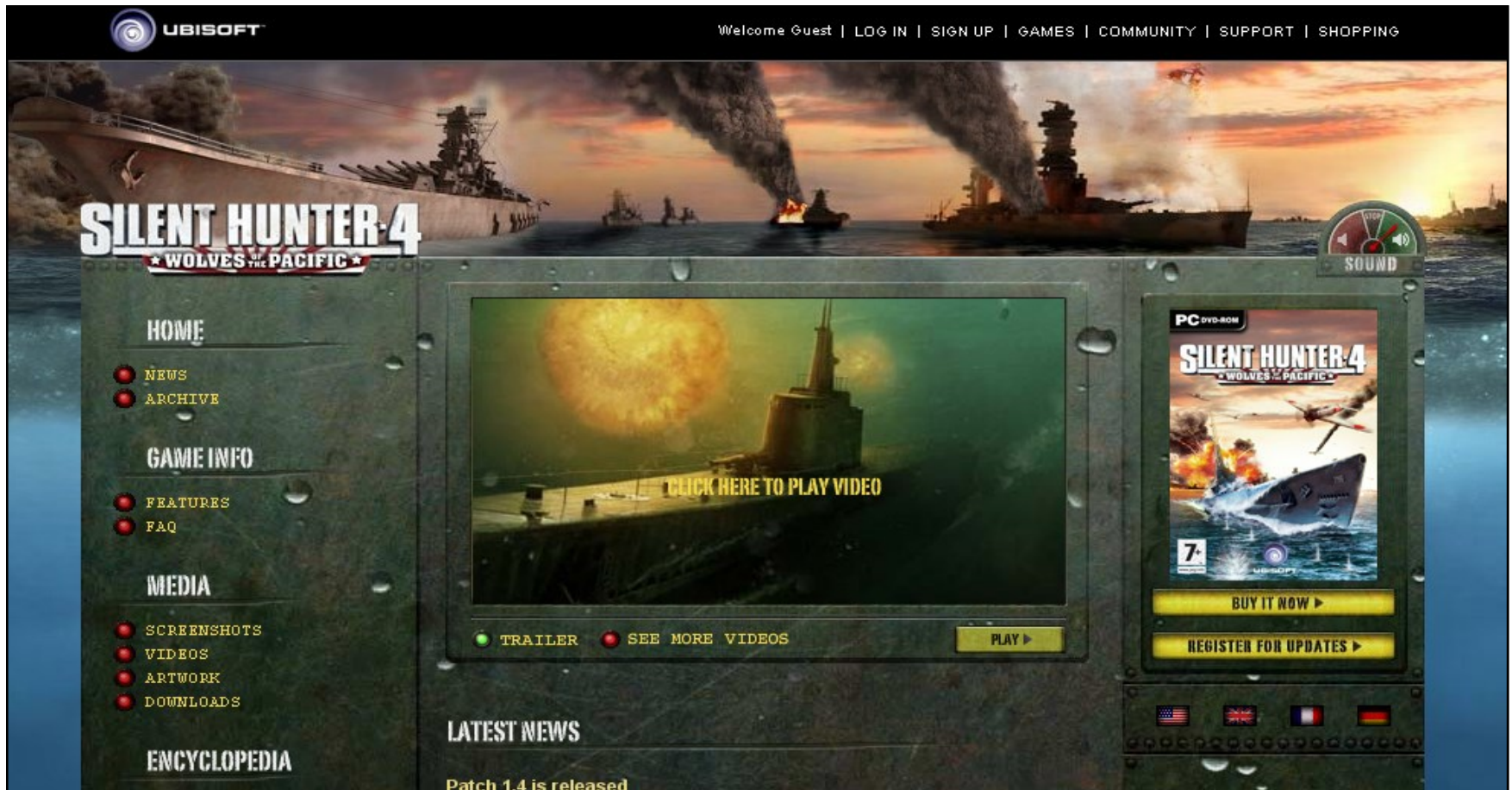
Amazon; (2007) www.amazon.com

Real world invoices are also simulated



# Game Metaphors

www.silenthunter4.uk.ubi.com



Silent Hunter; (2007) [silenthunter4.uk.ubi.com](http://silenthunter4.uk.ubi.com)

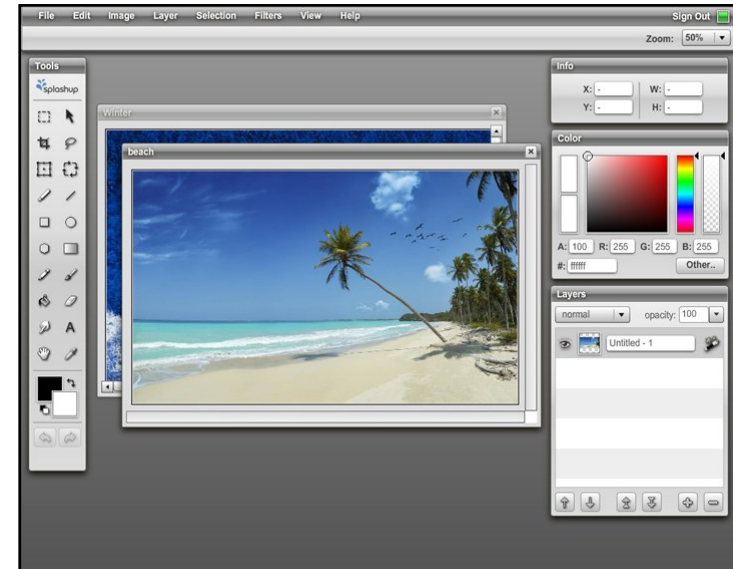
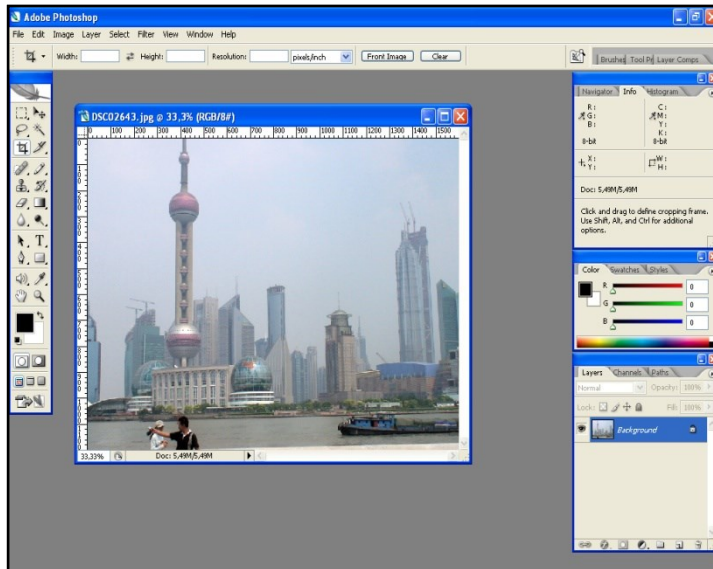
Entertainment industry design their webs to look like their interactive products

# Metaphors

## Design based on Metaphors

### ❖ Pros

- Easy to Learn.
- Predictable.
- Similar metaphors share skills.



Splashup; (2007) www.splashup.com



# Metaphors

## Conservative Thinking

### ❖ Trenches warfare (World War I)



# Metaphors

## Conservative Thinking

- ❖ Trenches warfare (World War I)



Tanks were named *Land Cruisers*

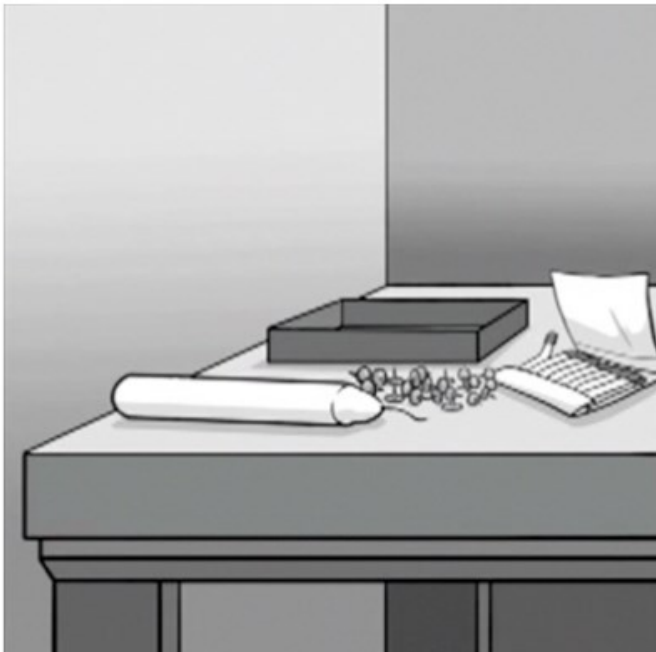
Tactics were based on escort duties

# Metaphors

## Conservative versus Lateral Thinking

### Functional fixedness

Functional fixedness is a cognitive bias that limits a person to using an object only in the way it is traditionally used<sup>1</sup>.



### The candle Test<sup>1</sup>

1. You have candle, a box of thumbtacks, and a book of matches, and asked them to attach the candle to the wall so that it did not drip onto the table below
2. Attach the candle to the wall so that it does not drip onto the table below.



<sup>1</sup>[en.wikipedia.org/wiki/Functional\\_fixedness](https://en.wikipedia.org/wiki/Functional_fixedness)



# Metaphors

## Conservative versus Lateral Thinking



## Design Based on Metaphors

### ❖ Cons

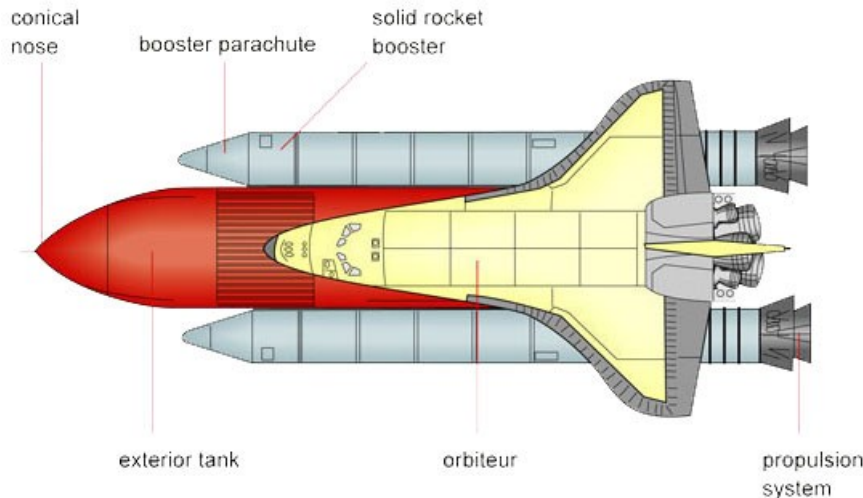
- Heavy dependence on problem's domain.
- Promotes conservative thinking.
  - Introduction of new metaphors is a very difficult task.
- Backward compatibility makes introduction of changes and improvements a very difficult task.

# Conservative Thinking: Case of Study

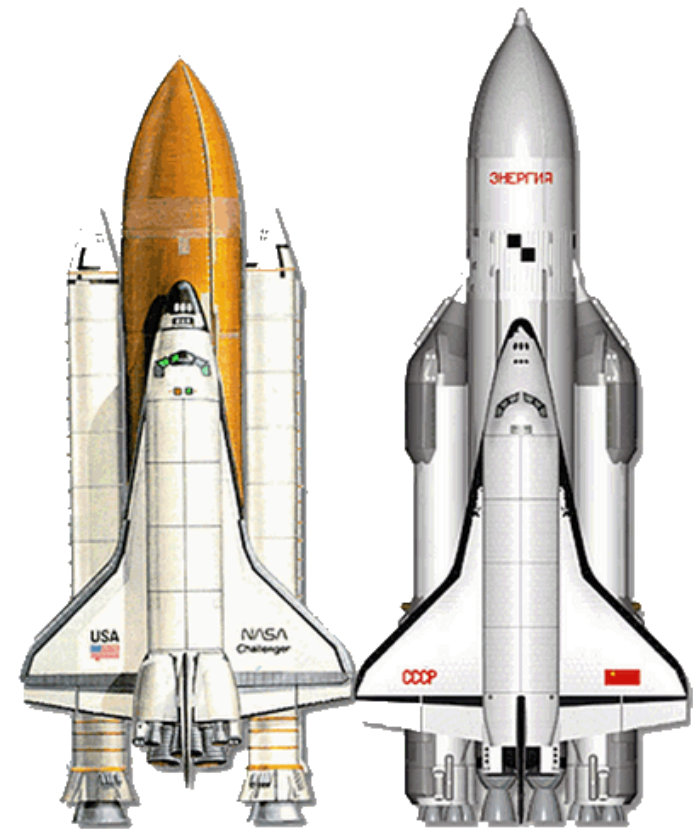
## The Design of the Space Shuttle

### Space Shuttle's SRB design

Solid Rocket Boosters (SRB) were about 5 feet wide. Engineers who designed them would have preferred to make them a bit fatter, but they could not...



Space Shuttle; (2007) [www.infovisual.info](http://www.infovisual.info)



# Conservative Thinking: Case of Study

## The Design of the Space Shuttle

### Shipping the SRBs

The SRBs were made by **Thiokol** at their factory at Utah.

The SRBs had to be **shipped by train** from the factory to the launch site in the Kennedy Space Center (Florida).

The railroad line from the factory **happens to run through several tunnels** in the mountains and the SRBs had to fit through those tunnels.

The tunnels are slightly wider than the railroad track, and the **railroad is the USA are 4 feet, 8.5 inches wide.**



NASA; (2007) [www.nasa.gov](http://www.nasa.gov)



# Conservative Thinking: Case of Study

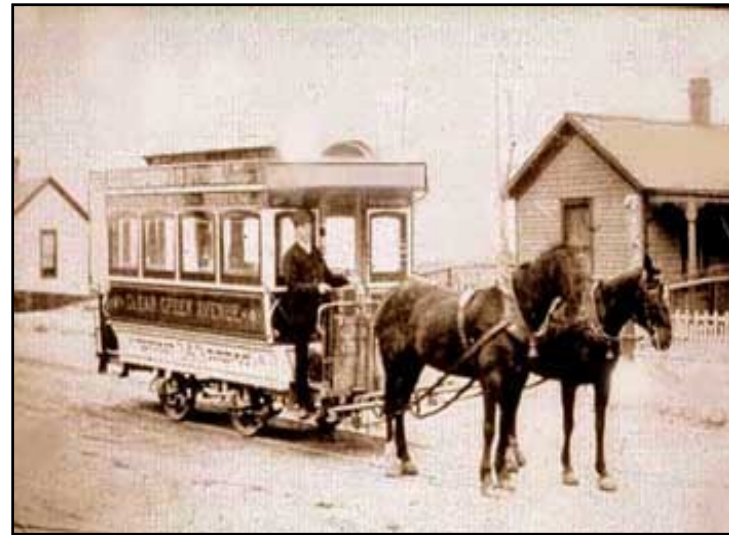
## The Design of the Space Shuttle

### The Design of the US Railways

The US standard railroad gauge (distance between the rails) is 4 feet, 8.5 inches because that's the way they built them in England, and **English expatriates built the US Railroads.**

English build them like that because the first rail lines were built by the same people who built the **pre-railroad tramways**, and that's the gauge they used.

People who built the tramways used the same jigs and tools that they **employed for building wagons, which used that wheel spacing.**



# Conservative Thinking: Case of Study

## The Design of the Space Shuttle

### Medieval British Horse Wagons

British wagon gauge was 4 feet, 8.5 because if they tried to use any other spacing, the wagon wheels would break on some of the old, long distance roads in England, **because that's the spacing of the wheel ruts.**

Imperial Rome **built the first long distance roads in Europe** (and England) for their legions and they have been used ever since.

Roman war chariots formed the initial ruts, which **everyone else had to match** for fear of destroying their wagon wheels.



Turner, D; (2007) www.morgefile.com



Gonzalez-Rodriguez, Martin; (2005) Athens

# Conservative Thinking: Case of Study

## The Design of the Space Shuttle

### Conclusion

Imperial Roman war chariots were made just **wide enough to accommodate the back ends of two war horses!**

A major Space Shuttle design feature of what was arguably the world's most advanced transportation system...

...was determined **over two thousand years ago by the width of a horse's ass!**

The Awful Truth...

**ENGINEERS DESIGN WITH THEIR ASS!**



Natoli, Clara; (2007) www.morgefile.com



Vogt, Mary R; (2007) www.morgefile.com

# This course in a nutshell...

**THE DOOR PRANK**



**WEAR THE USER'S SHOES**

**THE INVISIBLE MIRROR PRANK**



**CATCH THE USER'S ATTENTION**

**THE SUBSTITUTE PRANK**



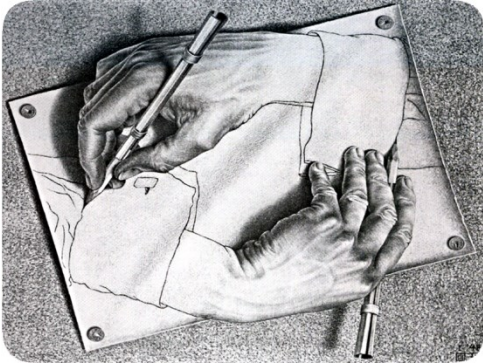
**DON'T LET THE USER GO**

**THE SHUTTLE'S ASS**



**INNOVATION HAPPENS!**





**Appendix**

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