

Multimedia and e-learning for statistics education

8 November 2007

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Multimedia and e-learning for statistics education

1. Examples: New media in statistics education

- Multimedia software “Descriptive Statistics”
- Multimedia project “New statistics”

2. Application to official statistics

3. New developments / Outlook

- Virtual libraries, Swivel and Many Eyes
- Blended learning



1. New media in statistics education

Multimedia software “Descriptive Statistics”

http://www.fernuni-hagen.de/e-statistik/index_en.htm

- Funded by the local government (until 2000)
- Animated textbook (only in German)
- Several learning levels
- Sound support (optional)
- Hybrid design: Up-to-date information via Internet
- Version 5 (2004): Inclusion of Eurostat data
- Version 6 scheduled for 2008

→ **Illustration**



1. New media in statistics education

Multimedia project “New Statistics”

www.fernuni-hagen.de/newstatistics

- **E-learning project for statistics education funded by the German government (until 2004)**
- **Consortium of 10 German universities**
- **Covers all topics of an introductory statistics course**
- **Goal: Improving the quality of statistics education**



1. New media in statistics education

Development of e-learning modules for statistics education
(mainly for use at universities)

Pillars of the e-modules:

Statistical Lab:
ad-hoc analyses of
user-defined data sets

**Interactive experiments and
simulations (Java):**
“trying out” statistical methods

Animations (Flash):
explanation of statistical
theory

Case studies:
“Real” life problems / data sets from
different sciences

→ **Illustration**

http://www.neuestatistik.de/demo/Demo_EN/start.html



2. Applications to official statistics

Transfer: Educational world → Official statistics

Statistics education:

Interactive experiments / simulations
(user-controlled **exploration of statistical methods**)



Official statistics:

Interactive visualization of data
(user-controlled **exploration of data sets**)

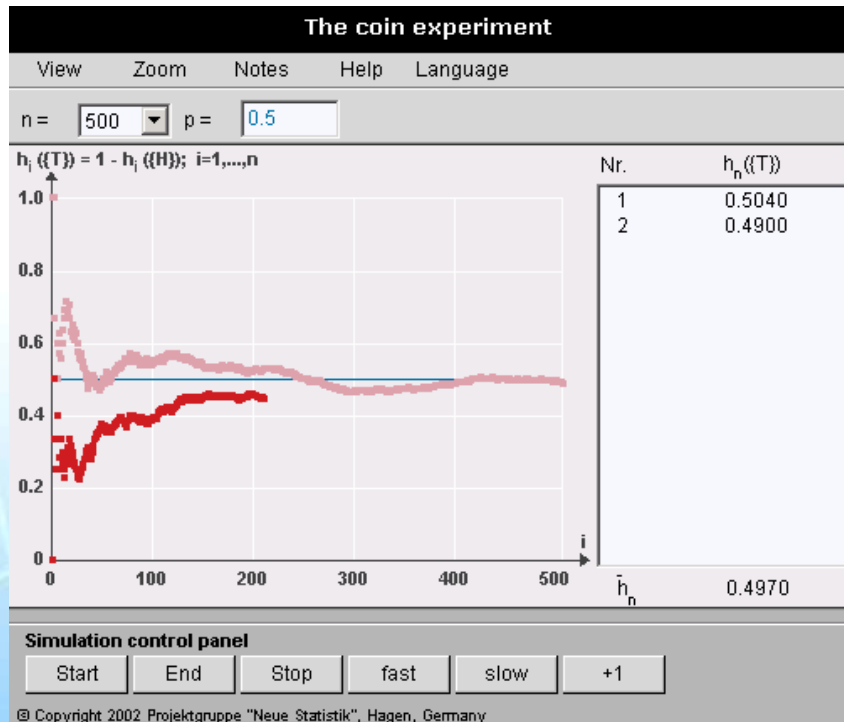


2. Applications to official statistics

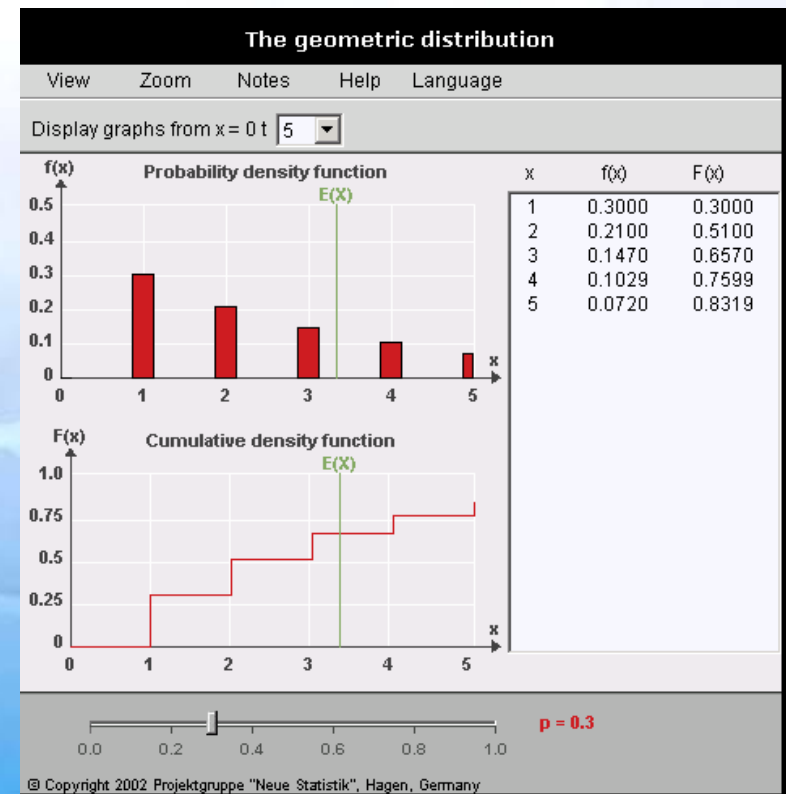
Starting point:

Experiment-driven visualization of statistical theory

Virtual coin experiment:



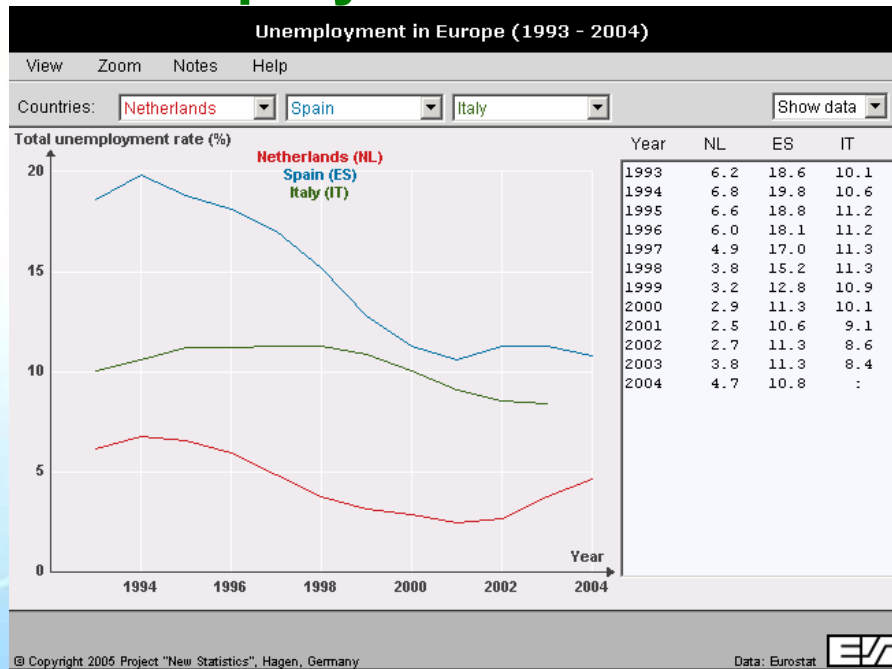
“Playing“ with distribution parameters:



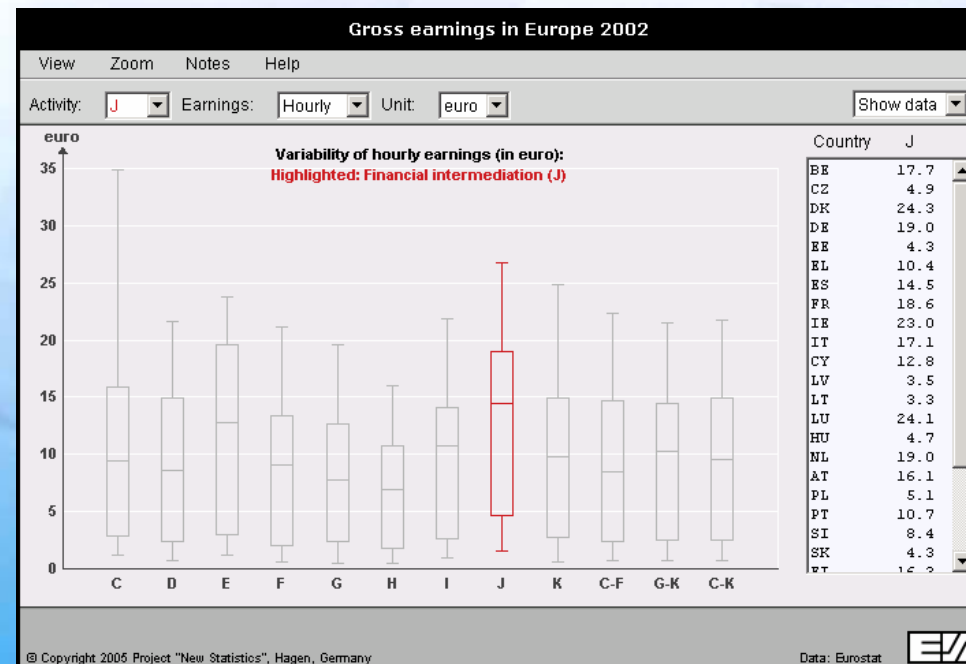
2. Applications to official statistics

Transfer: **Interactive visualization of data sets**

Unemployment rates in Europe:



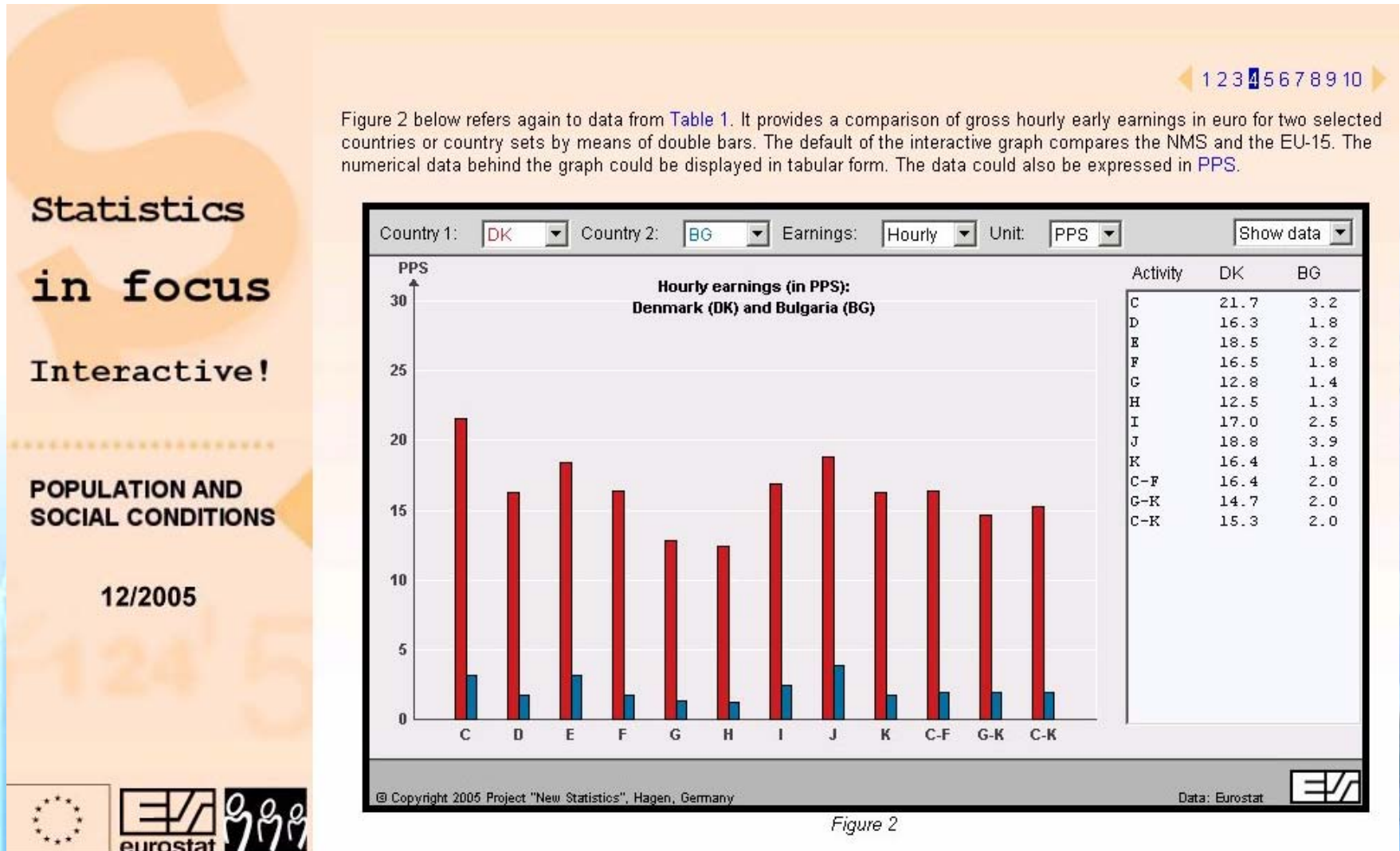
Gross earnings in Europe:



→ **Illustration**

2 . Applications to official statistics

Added value for Web publications: Interactivity



3 . New developments / Outlook

Blended learning approach

Traditional seminars



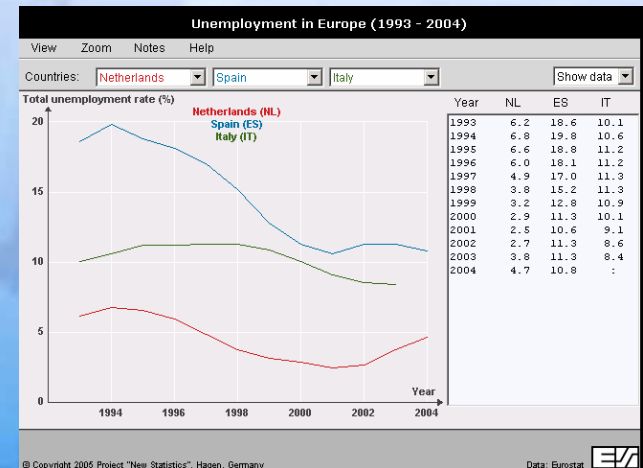
E-courses



Static course material



E-components



3 . New developments / Outlook

Virtual libraries containing elements for the visualization of statistical methods or data (Java, SVG, Flash):

Sharing between different content providers
(statistical offices / educational institutions)

- **Universities:** Use within introductory statistics courses

Example: CAUSE

- **Provision of free data for the Web 2.0 community:**
- **Swivel:** Wiki-type platform for presenting and discussing data and statistical graphs.
April 2007: The OECD loaded indicators to Swivel.
- **Many Eyes (IBM):** Interactive data visualization



3 . New developments / Outlook

Educational initiative: CAUSE

<http://www.causeweb.org/>

Consortium for the Advancement of Undergraduate Statistics Education

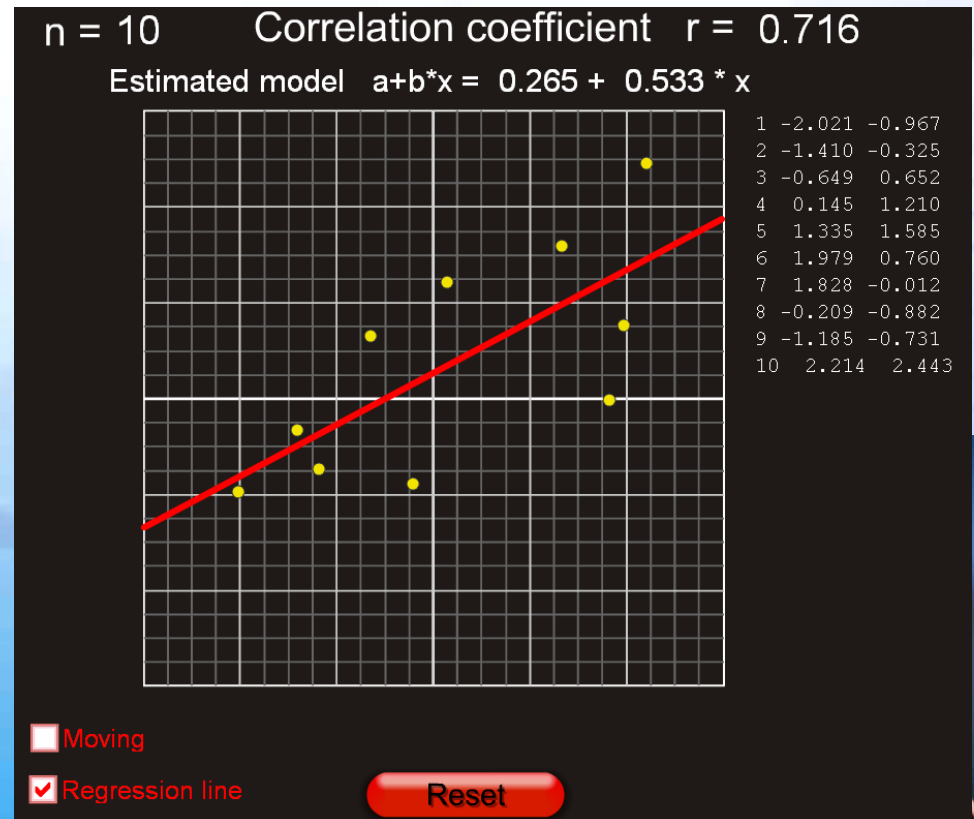
Example of an element contained in a virtual library (resources for teaching statistics (<http://www.causeweb.org/resources/>):

Flash-based experiment

“Correlation / LS estimation”

(direct access:

<http://noppa5.pc.helsinki.fi/koe/flash/corr/cp18.html>)



3 . New developments / Outlook

Example: Platform **Swivel**

Official data from **UNECE, OECD, US Dept. of Energy**

<http://www.swivel.com/graphs/show/21677585>



Male Life Expectancy at Birth by Country and Year

Views: 101
Created: about 1 month ago
Created By: [UNECE](#)
Size: 10 columns, 52 rows



Long-term Unemployment

Views: 402
Created: 4 months ago
Created By: [OECD](#)
Size: 34 columns, 38 rows



http://www.swivel.com/data_sets/show/1004956

<http://www.swivel.com/graphs/show/22671936>



World CO2 Emissions per Capita by Region

Views: 130
Created: 21 days ago
Created By: [US Department of Energy](#)
Size: 3 columns, 200 rows



3 . New developments / Outlook

Example: Platform **Many Eyes**

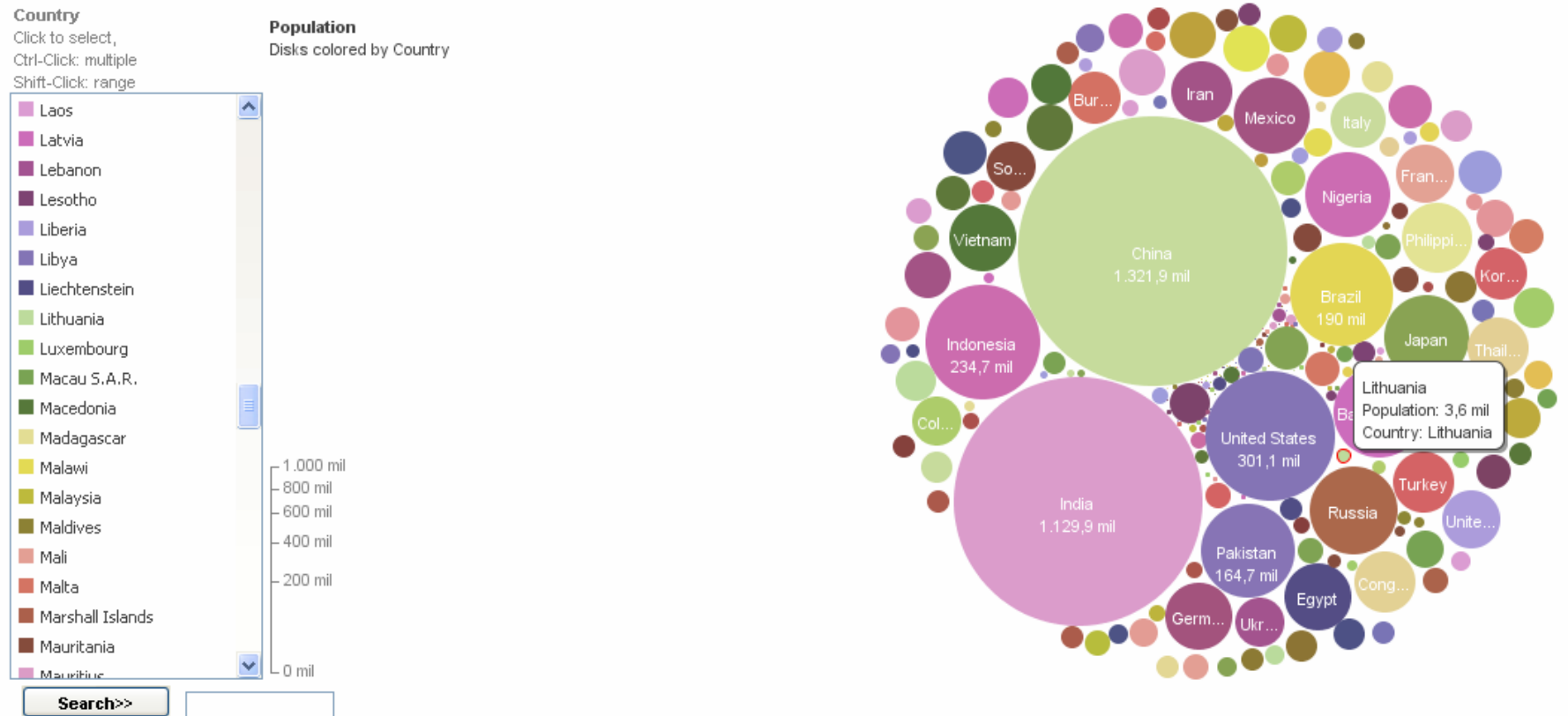
World population, interactive visualization for 2007

<http://services.alphaworks.ibm.com/manyeyes/view/Slk76lsOtha65EWmLmPbl2->

Visualizations : Population by Country - 2007

Can't see the visualization? Download the latest Java plugin [here](#). On Macs: best viewed in Safari.

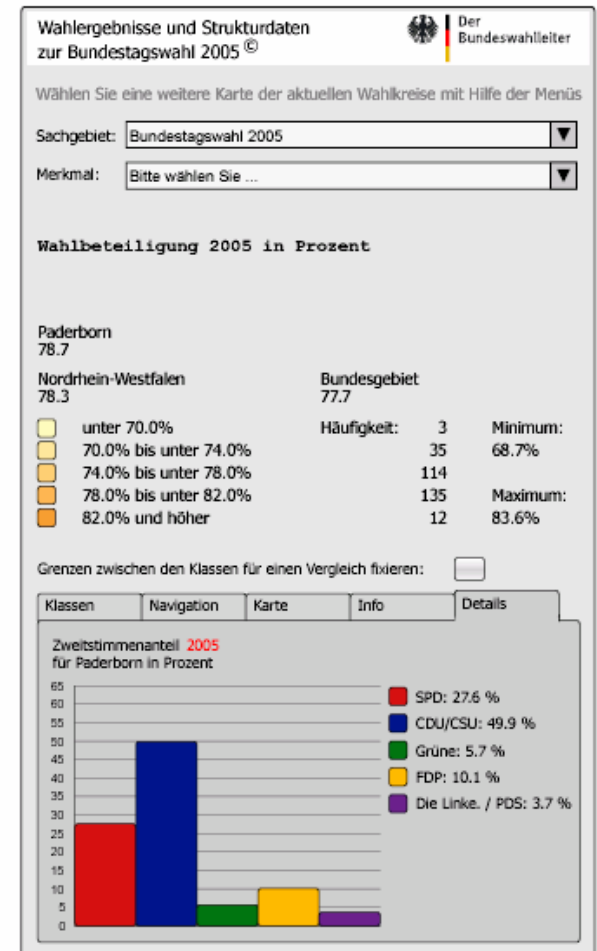
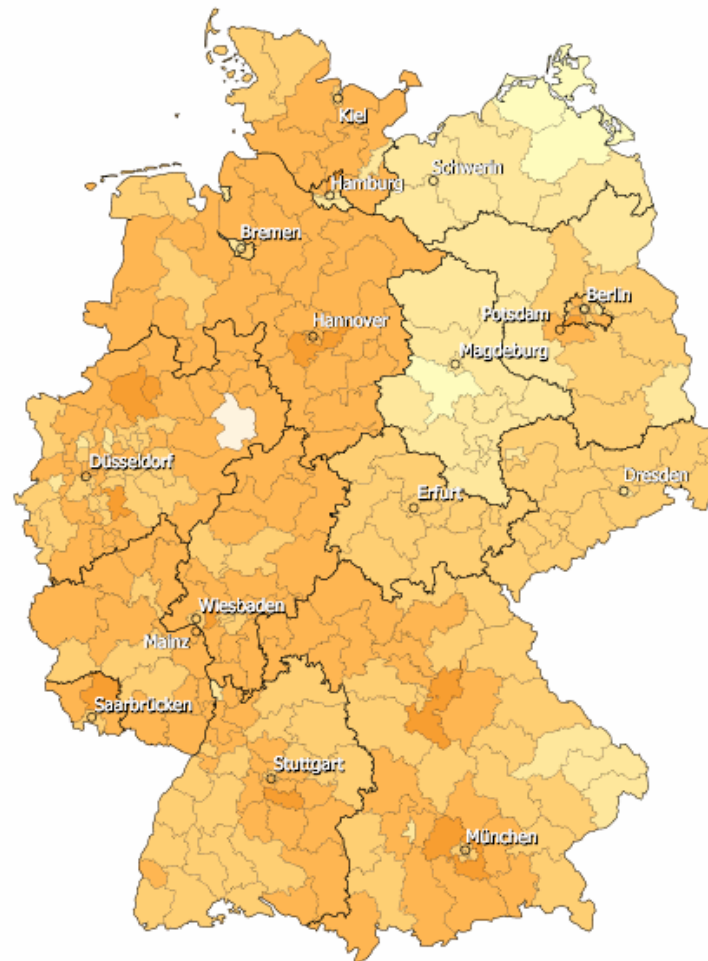
Created by: **Youri** Created on: Saturday August 25, 11:55 AM



3 . New developments / Outlook

Example “Graphs + dynamic maps”

<http://www.bundeswahlleiter.de/wahlen/bundestagswahl2005/onlineatlas/btwClientKarte.htm>

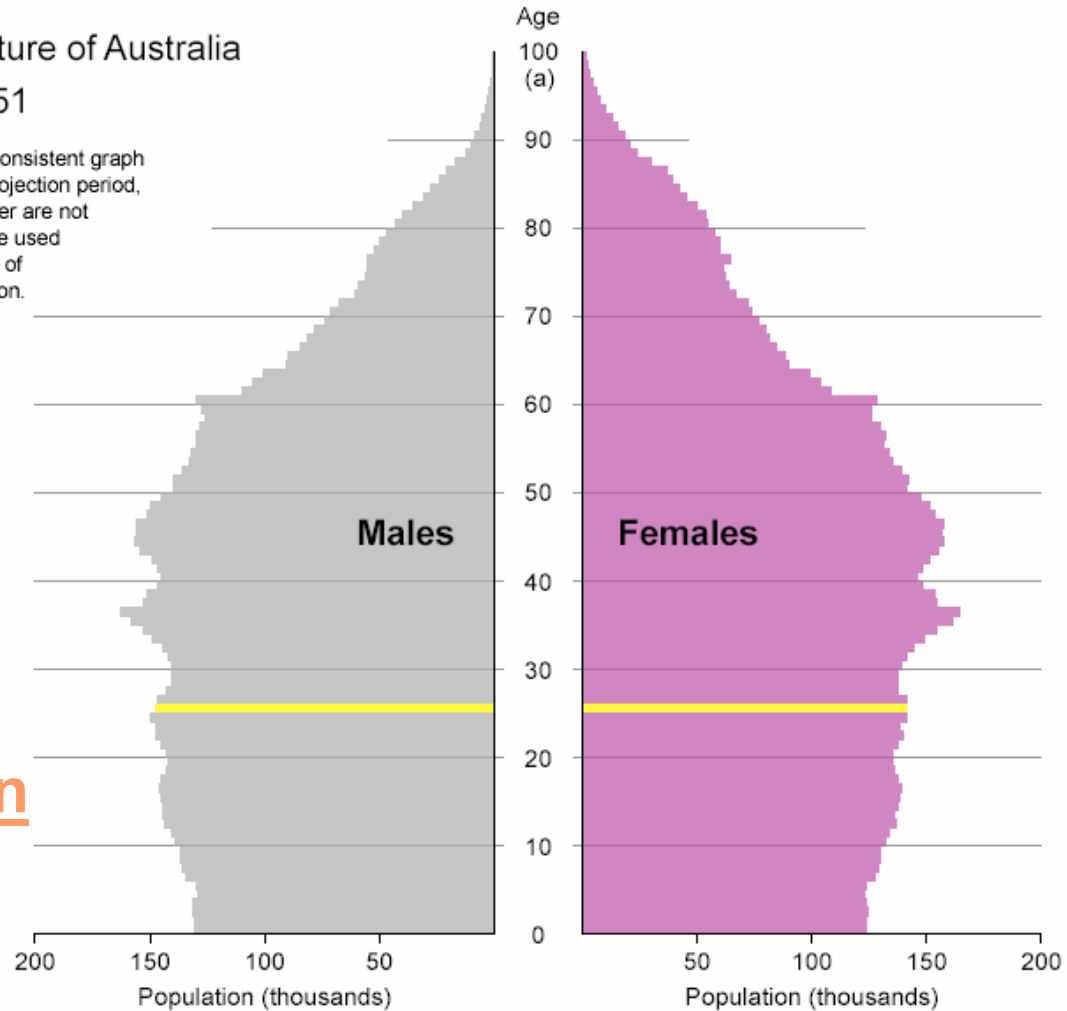


3 . New developments / Outlook

Example “Population pyramids”

Age Structure of Australia
1971 - 2051

(a) To ensure a consistent graph scale over the projection period, ages 100 and over are not displayed, but are used in the calculation of the total population.



2007

Total (mil.): 20.8

* Projected Data

Aged 25

Born 1981-1982

Males: 147692

Females: 141583

Sex Ratio: 104.3
(males per 100 females)

Highlight surplus of males or females

Animate

play

pause

speed



Start: 1971



End: 2051

Help

→ Illustration

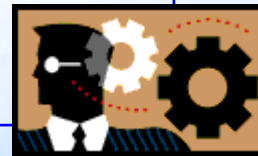
3 . New developments / Outlook

Blended learning approach: Statistics for students in sociology, political sciences, psychology

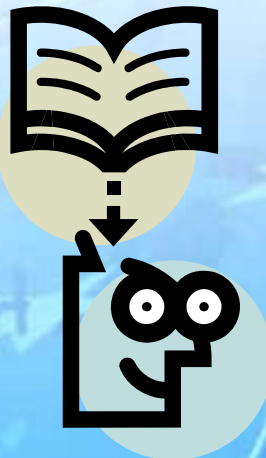
Traditional seminars



E-course (pdf + hyperlinks)



Static course material

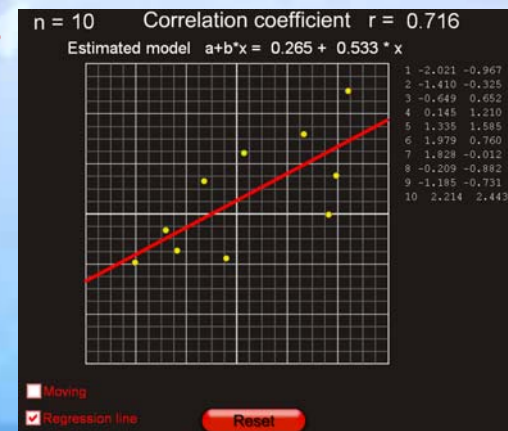


Communication forum +

e-components

(platform:
Moodle)

→ Illustration



Web links:

- **related to own projects:**

http://www.fernuni-hagen.de/e-statistik/index_en.htm

<http://www.fernuni-hagen.de/newstatistics>

<http://forum.europa.eu.int/Public/irc/dsis/wages/information>

<http://statind.jrc.it/ebusiness.html>

- **related to very recent visualization developments:**

Business Cycle: [http://www.cbs.nl/en-](http://www.cbs.nl/en-GB/menu/themas/dossiers/conjunctuur/publicaties/conjunctuurbericht/klok/ck-homepage.htm)

[GB/menu/themas/dossiers/conjunctuur/publicaties/conjunctuurbericht/klok/ck-homepage.htm](http://www.cbs.nl/en-GB/menu/themas/dossiers/conjunctuur/publicaties/conjunctuurbericht/klok/ck-homepage.htm)

Wiki-type platforms (social software):

Swivel: <http://www.swivel.com>

Many eyes: <http://services.alphaworks.ibm.com/manyeyes/browse/visualizations>



Thank you for your attention!

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