

# LITTLE GIRLS, BIG DATA, BIGGER ANALYTICS



**EA'S BOX**

Learning Analytics  
Toolbox



**LEA's BOX stands for a Learning AnalYTics toolBOX that supports**

- a competence-centred, multi-source formative assessment methodology
- on the foundations of sound psycho-pedagogical models (i.e., *Competence-based Knowledge Space Theory* and *Formal Concept Analysis*)
- intelligent model-based reasoning services
- innovative visualization techniques
- tailored to the concrete demands and requirements of teachers and learners



STREP - 1,4 M € - 33 Months – 4 Partners





## Main Objectives I

***Develop LA/EDM algorithms and services on the basis of 2 important psycho-pedagogical frameworks:***

- Competence-based Knowledge Space Theory (CbKST), which originated from the field of intelligent tutorial system and which has been advanced in the contexts of intelligent educational games as well as in the light of formative assessment and feedback
- On the other hand the Formal Concept Analysis (FCA), which originated from applied mathematics as an attempt to formalize concepts and concept hierarchies.



## Main Objectives II

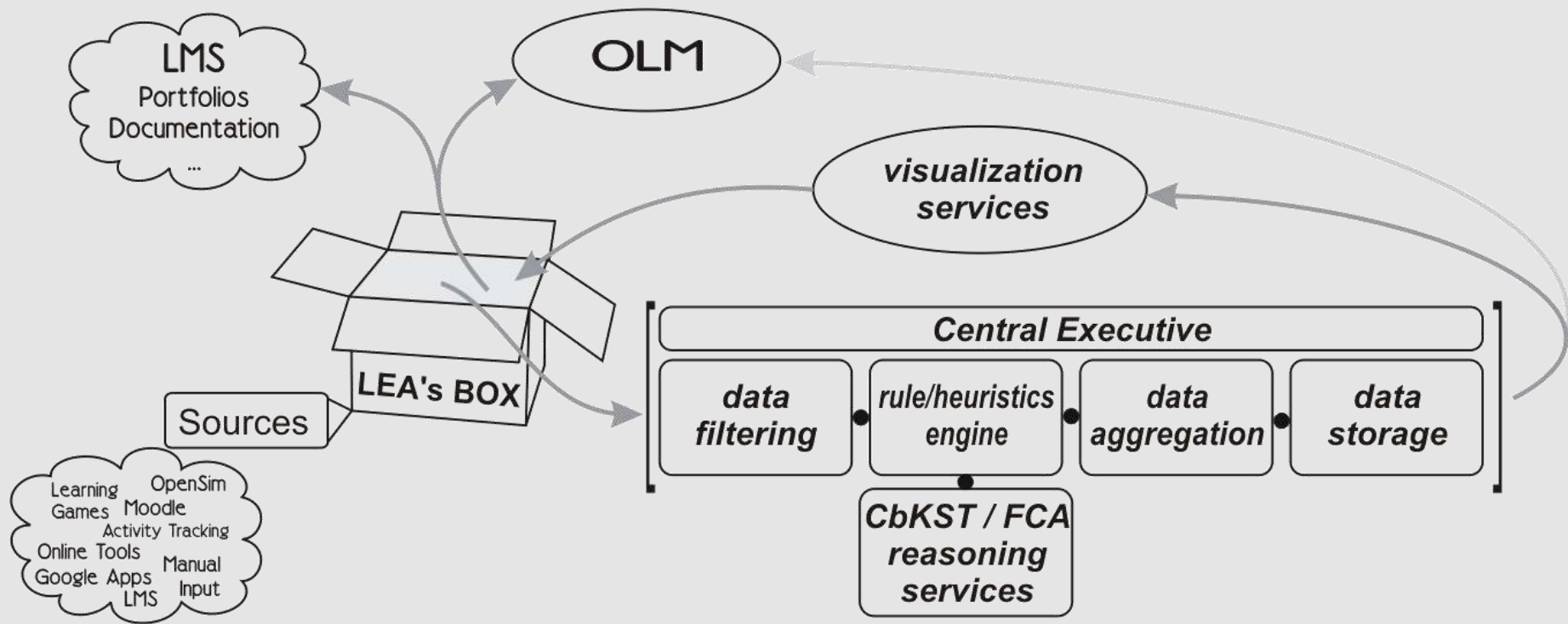
***Develop novel approaches to visualizing activity/  
performance/achievement data***

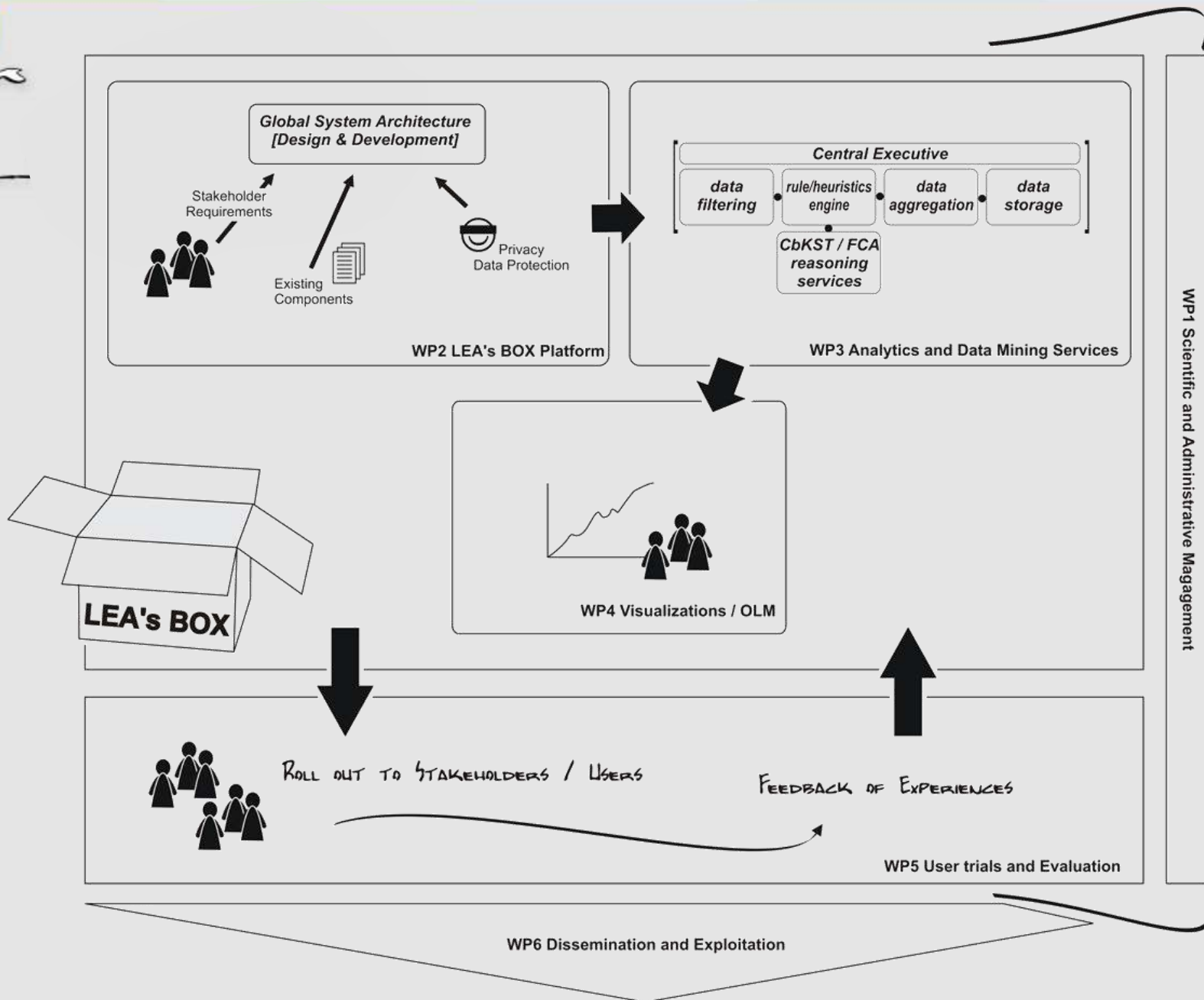
by utilizing methods such as structural Hasse diagrams. The ultimate goal is to feed back a broad spectrum of educationally relevant information to the involved stakeholders (in particular teachers but also students, administrators, and even parents).



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**... about the light field camera and  
Google's flu trend ...  
So what?**





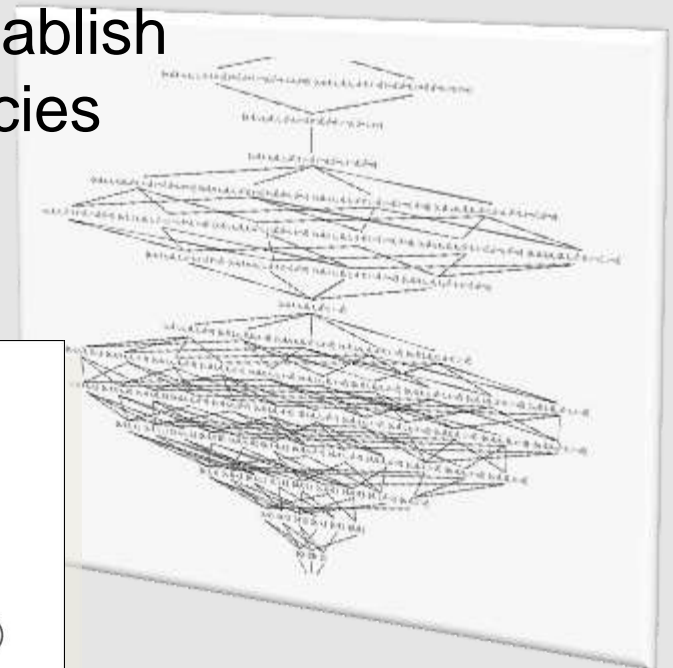
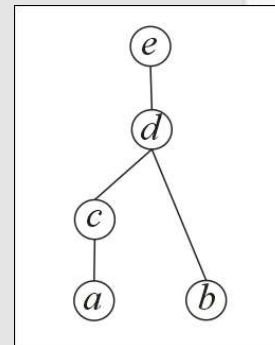
# *In Essence ...*





# CbKST in 10': All grey theory

- Domain analysis → decompose a domain into a catalogue of **atomic chunks** of *aptitude* (knowledge, ability, skills, competence)
- Finding the **natural course** → establish a relation between the competencies
- Deriving a **global structure** → competence structure
- Linking **behavior** to competence (structures) probabilistically





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# The colorful theory



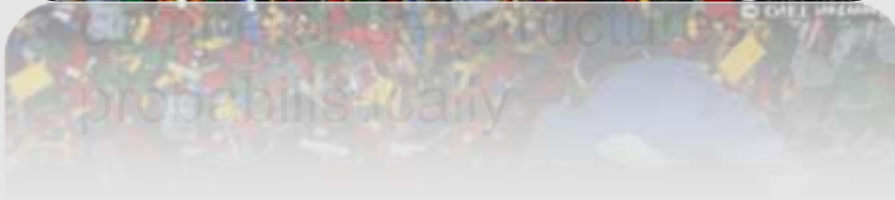
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# The colorful theory



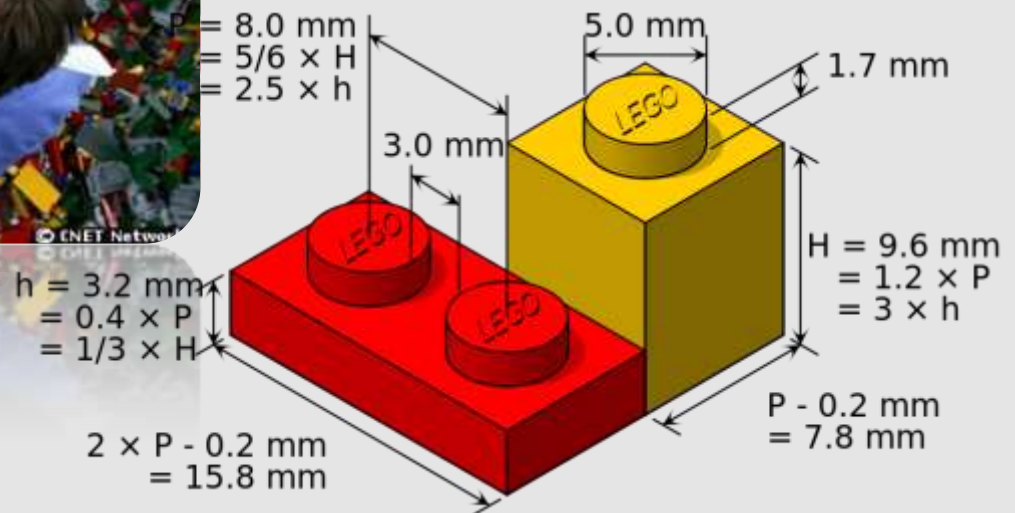




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# The colorful theory

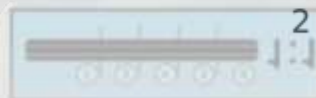
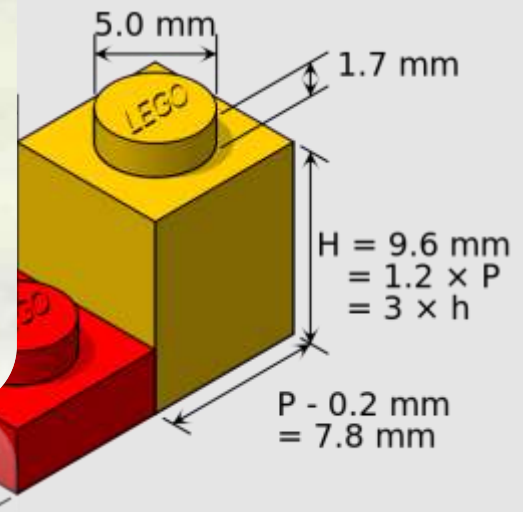
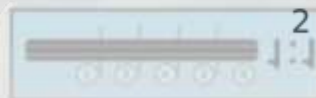
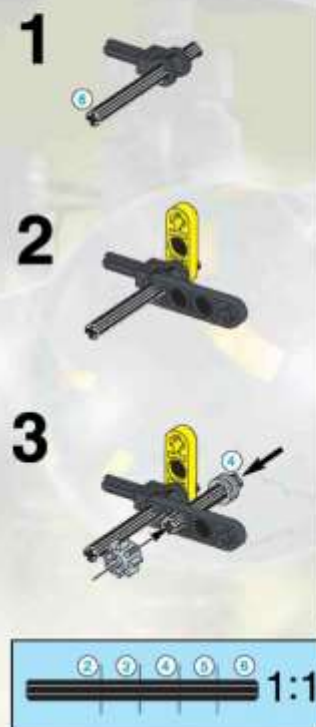




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# The colorful theory



$$2 \times P - 0.2 \text{ mm} = 15.8 \text{ mm}$$





GRATIS

**BUILD  
THE  
CHANGE**

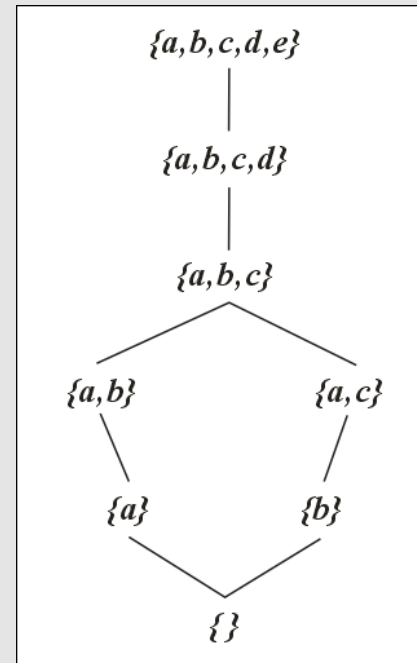
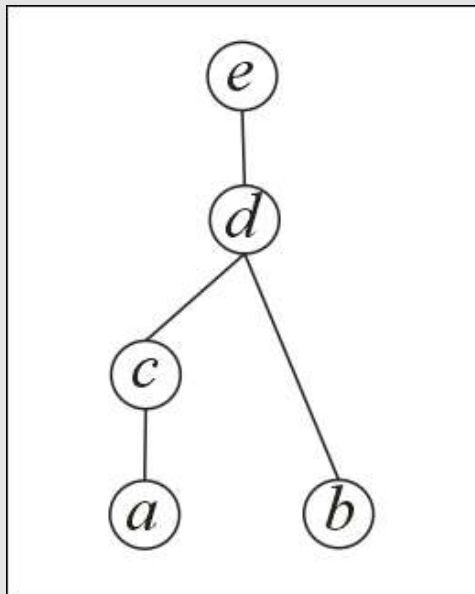
2. - 5. OKTOBER  
IN GRAZ





# *CbKST in 10': All grey theory*

... in essence:



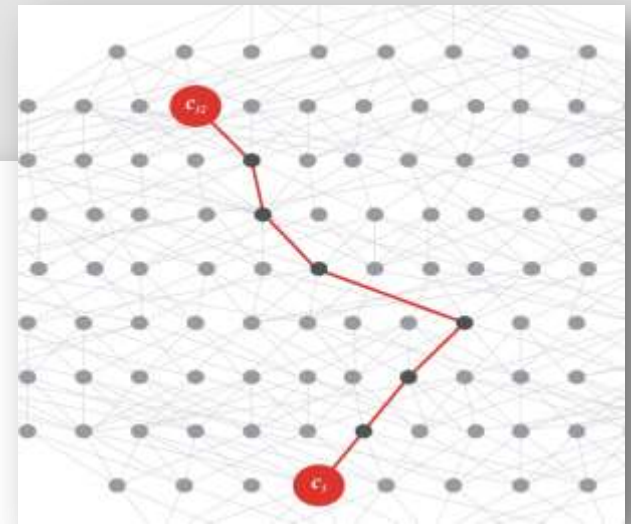
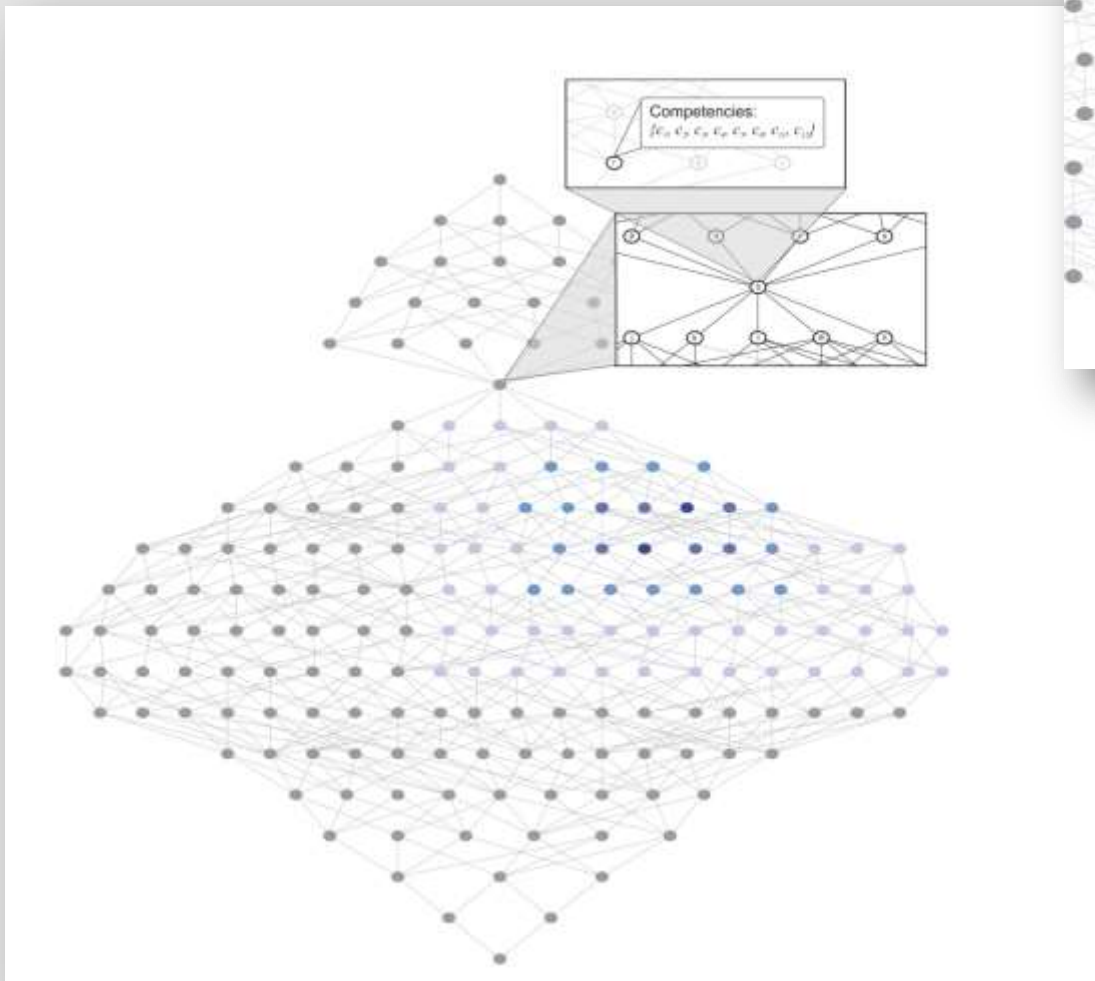




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# Hasse diagrams



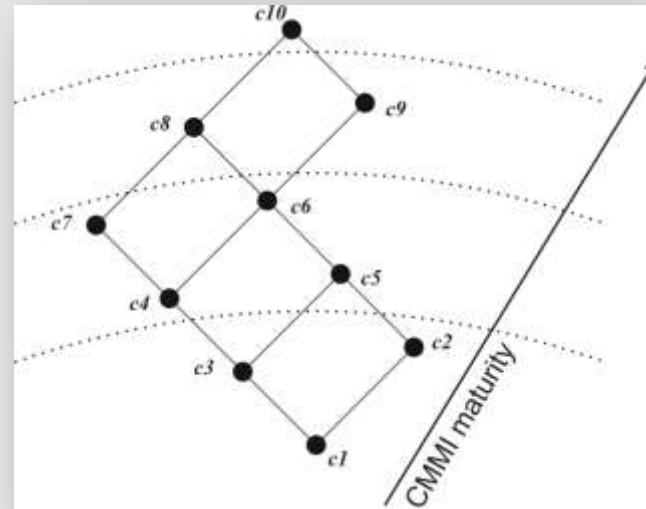
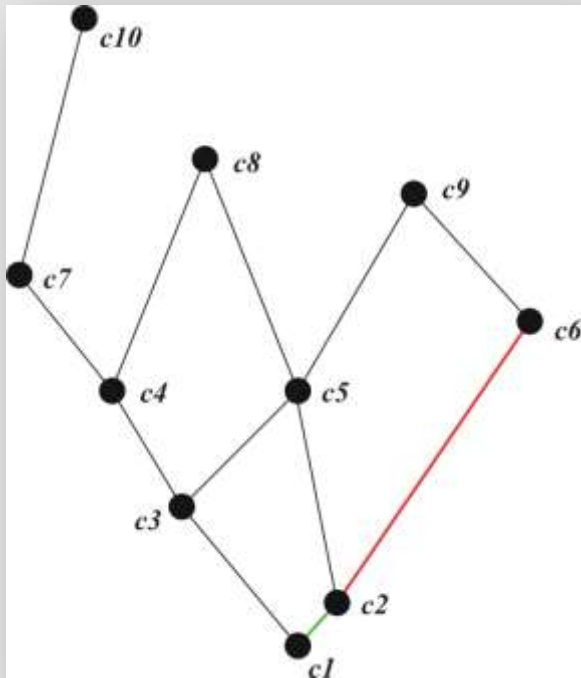
States, paths & fringes



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# Hasse diagrams



Costs & levels

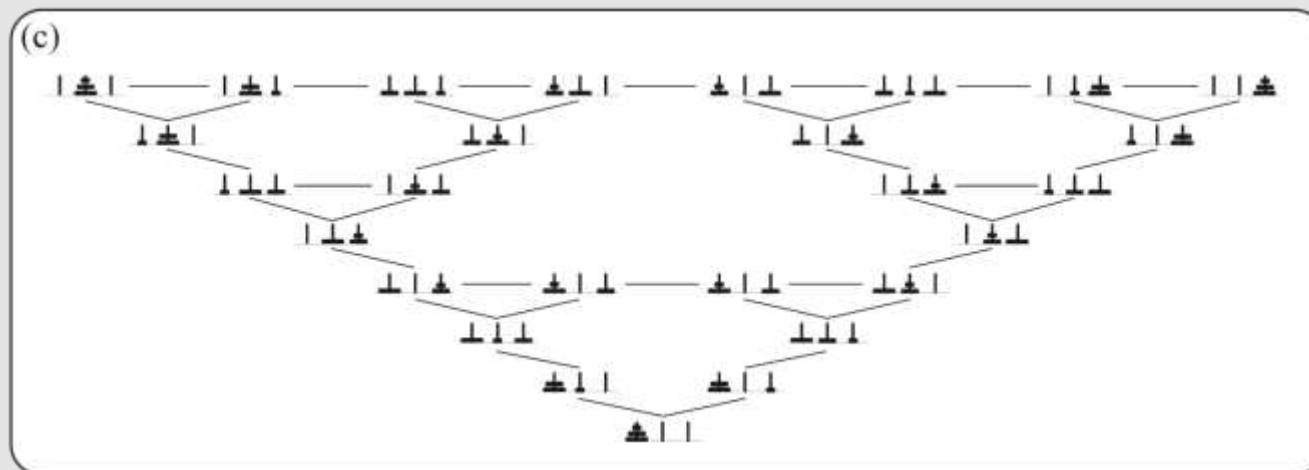
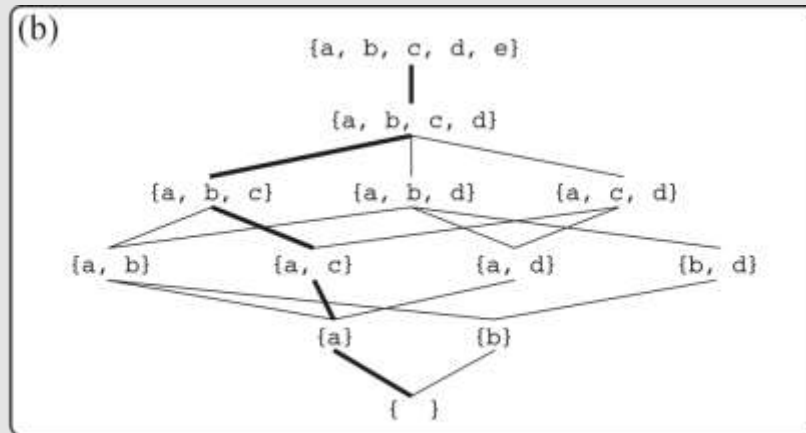
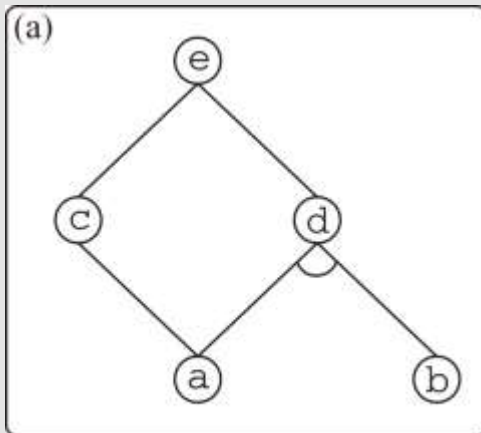


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*And beyond ....*

## Merging with Problem Spaces

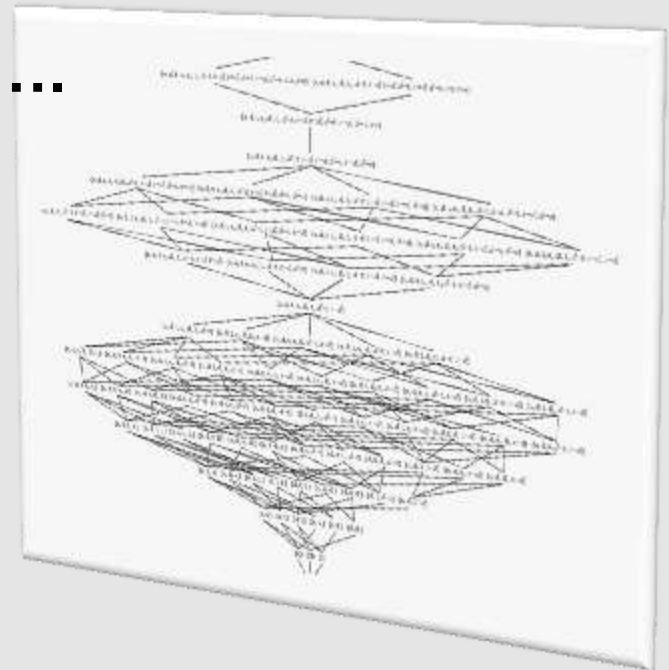
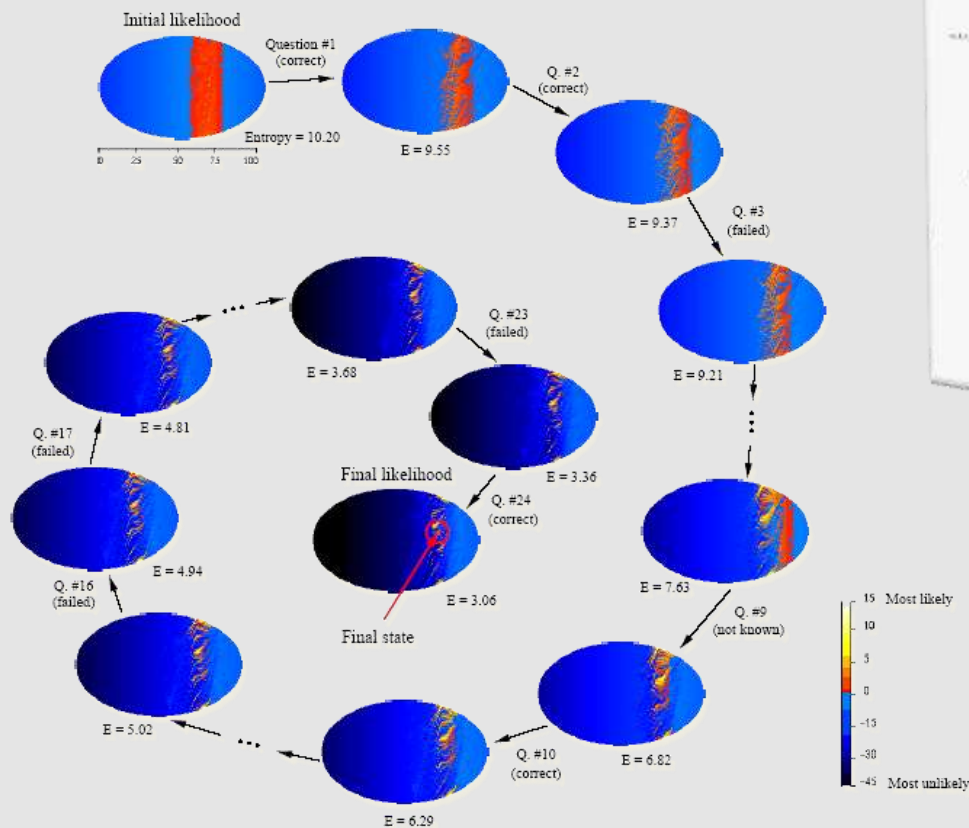




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# And beyond ...

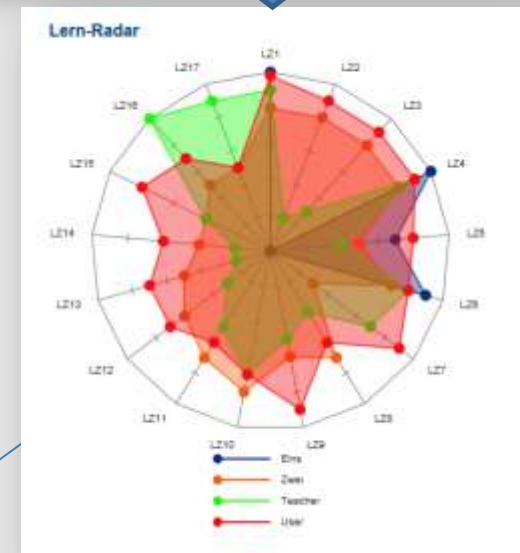
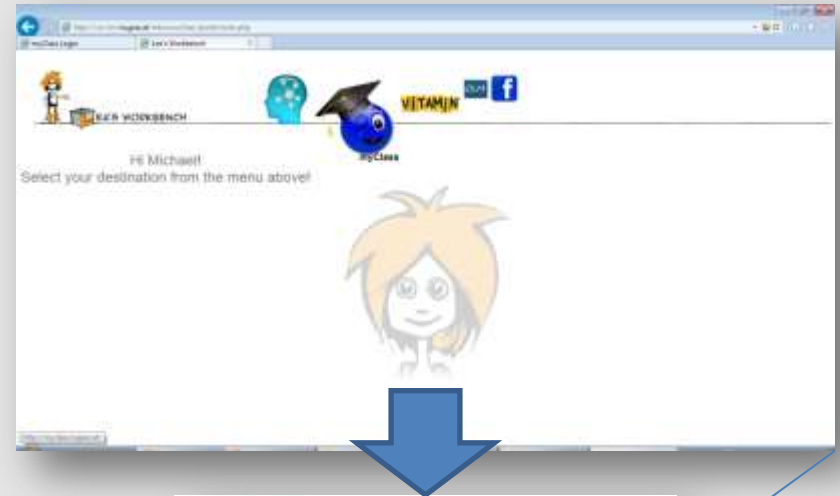
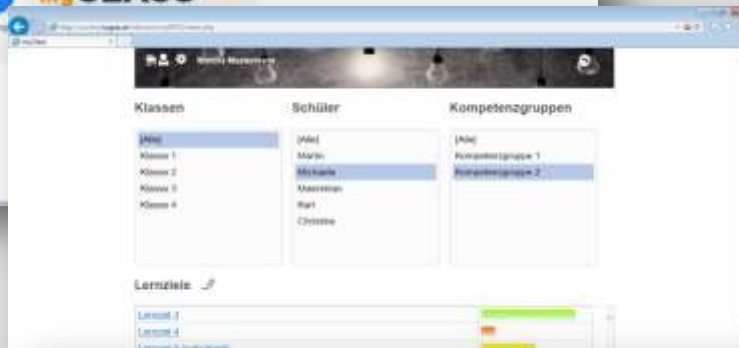
## An iterative LA loop of pixel clouds....





# And Lea's BOX?!

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EA'S BOX

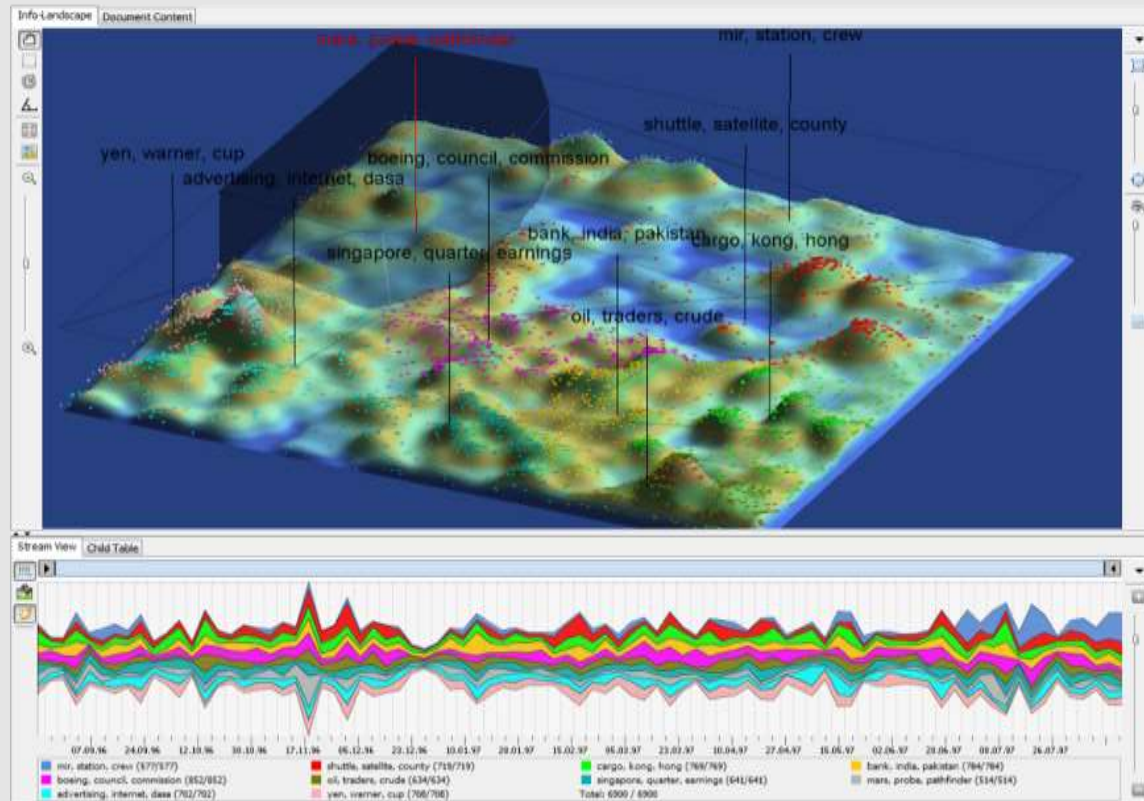
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# And Lea's BOX?!

Teachers Views: Skill

Skills landscape:

- Combined with LO's and TI's
- Show the usage of Los and Tis in the map and over time

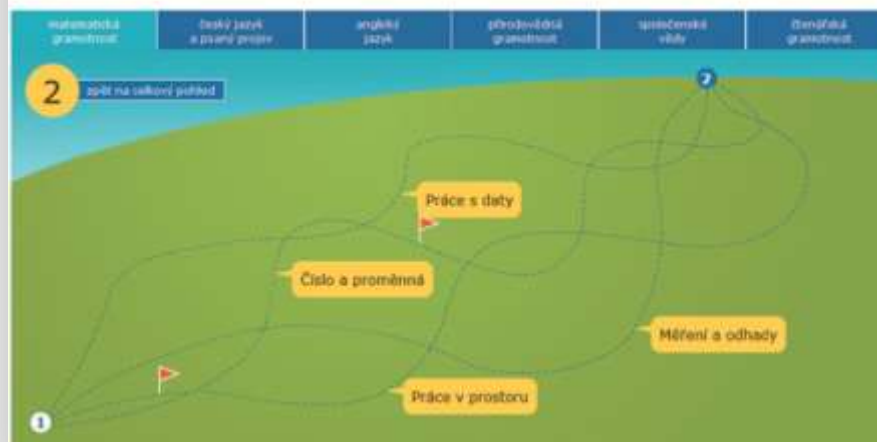
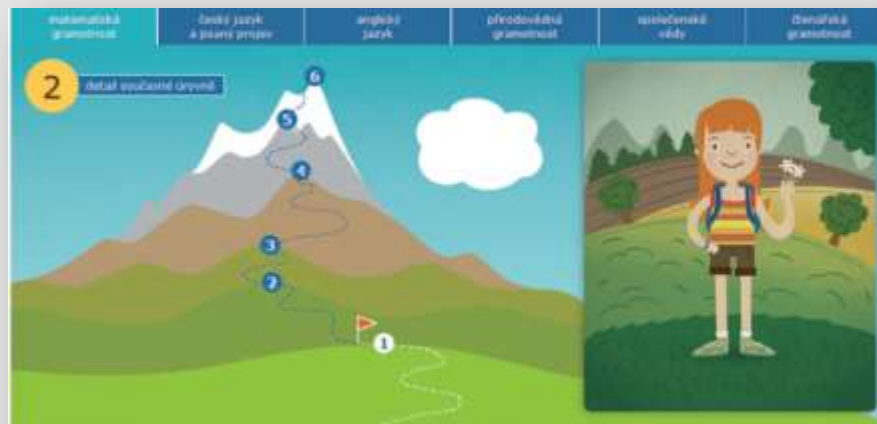


The pictures are taken out of other project (ignore the topics) – however they could be applied for Lea's Box



# And Lea's BOX?!

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*... makes the portal!*

The screenshot shows a web browser window with the URL <http://www.leas-box.eu/>. The page is titled "Logged in as: Michael !!" and includes a "Logout" link. The main content area is divided into several sections:

- EA'S WORKBENCH**: A section with a cartoon character and a box icon.
- Hi sample!**: A greeting message followed by instructions: "Select one of the widgets and links on the right or directly enter the LA tools in the menu above!".
- Background Info**: A list of links to background information:
  - What is Learning Analytics and Data Mining?
  - An introduction to Learning Spaces (aka CbKST)
  - Open Learner Modelling at a glance
- Tools and Widgets**: A list of tools and widgets:
  - myClass v2.9
  - Czech version
  - Turkish version
- Lea's Blog**: A section with a blog post thumbnail.
- Lea's Website**: A section with a website thumbnail.
- Send Feedback**: A button at the bottom right.





Visit me at  
**[www.leas-box.eu](http://www.leas-box.eu)**

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