

Let's Teach Informatics – Empowering Pupils, Students and Teachers

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July 22nd 2002



What to teach in informatics?

How to teach informatics

Teachers reflect about ...

Summary: remaining ...

Thank you – questions?

Home Page

Title Page



Page 1 of 10

Go Back

Full Screen

Close

Quit

Summary

Goal: develop a didactical structure for a compulsory informatics course

- Structure depends on certain fundamental elements of the science informatics
- Results of curriculum research on informatics in secondary education
 - ⇒ decide which aspects have to be included when teaching informatics as subject
- Organize successful teaching and learning processes to enable students to
 - take an active role in long-term learning
 - express their requirements as users of modern technology
 - learn skills and acquire competences in using informatics systems

1 What to teach in informatics?

Give all students basic knowledge in informatics, on which to build in other subject fields.

- ⇒ principles enable the process of getting information out of data and those which allow the formulation of information so that it can be represented in data so informatics systems can process, transfer and convert this data
 - ⇒ practical experiences in acting with informatics systems, so pupils use theoretical elements in a practical oriented way – but knowledge in informatics is imperative to understand how "informatics inside" products work
- ⇒ transfer knowledge from one application field to another with the help of cognitive models

the object-oriented model is capable of supporting the process of setting up an informatics system, but also for analysing, deconstructing or describing the functionality of well known applications



What to teach in informatics?

How to teach informatics

Teachers reflect about ...

Summary: remaining ...

Thank you – questions?

Home Page

Title Page



Page 3 of 10

Go Back

Full Screen

Close

Quit

1.1 Conceptual elements

informatics systems are no more isolated "personal computers" but parts of networked environments

- ⇒ Pupils/students should know the basic elements "behind the scenes" before going to work in networked environments
 - ↪ basic knowledge regarding the Netiquette, based on network protocol structures, needs to be understood
- ⇒ object-oriented base for constructing and, naturally, analysing (deconstructing) solutions for problem areas
- ⇒ students should be enabled to know that it is possible to work with several paradigms to solve problems
 - ↪ find the appropriate paradigm for modelling special elements in the specific problem field

[What to teach in informatics?](#)

[How to teach informatics](#)

[Teachers reflect about ...](#)

[Summary: remaining ...](#)

[Thank you – questions?](#)

[Home Page](#)

[Title Page](#)

◀◀ ▶▶

◀ ▶

Page 4 of 10

[Go Back](#)

[Full Screen](#)

[Close](#)

[Quit](#)

1.2 Structuring - modularize

cognitive adoption to get mental models of informatics systems to work successfully with

Modern curricula are structured spiral and project-oriented theoretical elements of informatics have to be taught at every cognitive level

Modules

- ⇒ network and distributed processes
- ⇒ modelling informatics systems
- ⇒ elements of the theory of informatics
- ⇒ applications in a special field (for example linguistics, mathematics) and their background based on informatics

What to teach in informatics?

How to teach informatics

Teachers reflect about ...

Summary: remaining ...

Thank you – questions?

[Home Page](#)

[Title Page](#)

◀◀ ▶▶

◀ ▶

Page 5 of 10

[Go Back](#)

[Full Screen](#)

[Close](#)

[Quit](#)

2 How to teach informatics

**find problem fields, where students are able to get ideas
formulating problems and getting ideas for solutions**

- ➔ nearly all types of models ever developed are used in informatics
- ➔ succesful abstraction and putting into practice
- ➔ integrate a historical perspective as well as social elements in teaching informatics
- ➔ this way students understand how and why certain rules have been introduced
- ➔ problem-oriented teaching of informatics at all levels

Finding a way to structure the complex problem-solving process, enables students not only to work on informactics problems successfully, but also to structure other problem fields as well



What to teach in informatics?

How to teach informatics

Teachers reflect about ...

Summary: remaining ...

Thank you – questions?

[Home Page](#)

[Title Page](#)



Page 6 of 10

[Go Back](#)

[Full Screen](#)

[Close](#)

[Quit](#)

3 Teachers reflect about teaching informatics

interviewing informatics teachers on teaching informatics

- ⇒ common elements (experts in teaching informatics share)
 - modelling is the primary goal in teaching informatics
 - use sophisticated teaching software in the classroom
 - * software should be available under a free licence (like GPL), so teachers are able to adapt it for concrete learning groups
 - teachers are unhappy because hardware oriented elements are "thrown away" in actual curricula
- ⇒ main differences in vision and practise
 - most are realizing modeling in an object-oriented manner, but some think aloud of other models to be taught as basis upon



[What to teach in informatics?](#)

[How to teach informatics](#)

[Teachers reflect about ...](#)

[Summary: remaining ...](#)

[Thank you – questions?](#)

[Home Page](#)

[Title Page](#)



[Page 7 of 10](#)

[Go Back](#)

[Full Screen](#)

[Close](#)

[Quit](#)

4 Summary: remaining questions, ...

find ways to incorporate informatics as a compulsory course for all pupils at secondary I level

- ⇒ Teaching physics has not to enable pupils to build up the cabling of houses or setting up a power station.
- ⇒ Teaching informatics should not be identified with handling applications.
- ⇒ The fundamentals in informatics are high abstract concepts which lead to solutions everyone is able to use but only a few understand.
- ⇒ Qualify teachers so they can deal responsible with high elaborated networked informatics systems.
- ⇒ This process should not only be turned out but be controled with best possible evaluation so only those concepts find their way into school which are valid and enables students to use it in a responsible manner.

[Home Page](#)

[Title Page](#)

◀◀ ▶▶

◀ ▶

Page 8 of 10

[Go Back](#)

[Full Screen](#)

[Close](#)

[Quit](#)

What to teach in informatics?

How to teach informatics

Teachers reflect about ...

Summary: remaining ...

Thank you – questions?

5 Thank you – questions?

Home Page

Title Page



Page 9 of 10

Go Back

Full Screen

Close

Quit

What to teach in informatics?

How to teach informatics

Teachers reflect about . . .

Summary: remaining . . .

Thank you – questions?

Home Page

Title Page



Page 10 of 10

Go Back

Full Screen

Close

Quit