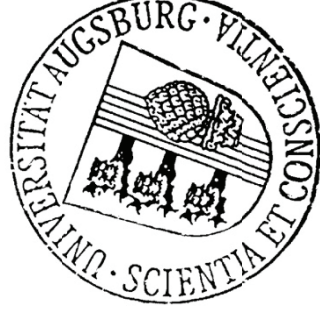


A Pattern for Innovations in Mathematics Education with ICT via Teacher Education

Volker Ulm, University of Augsburg



1. Innovations in complex systems

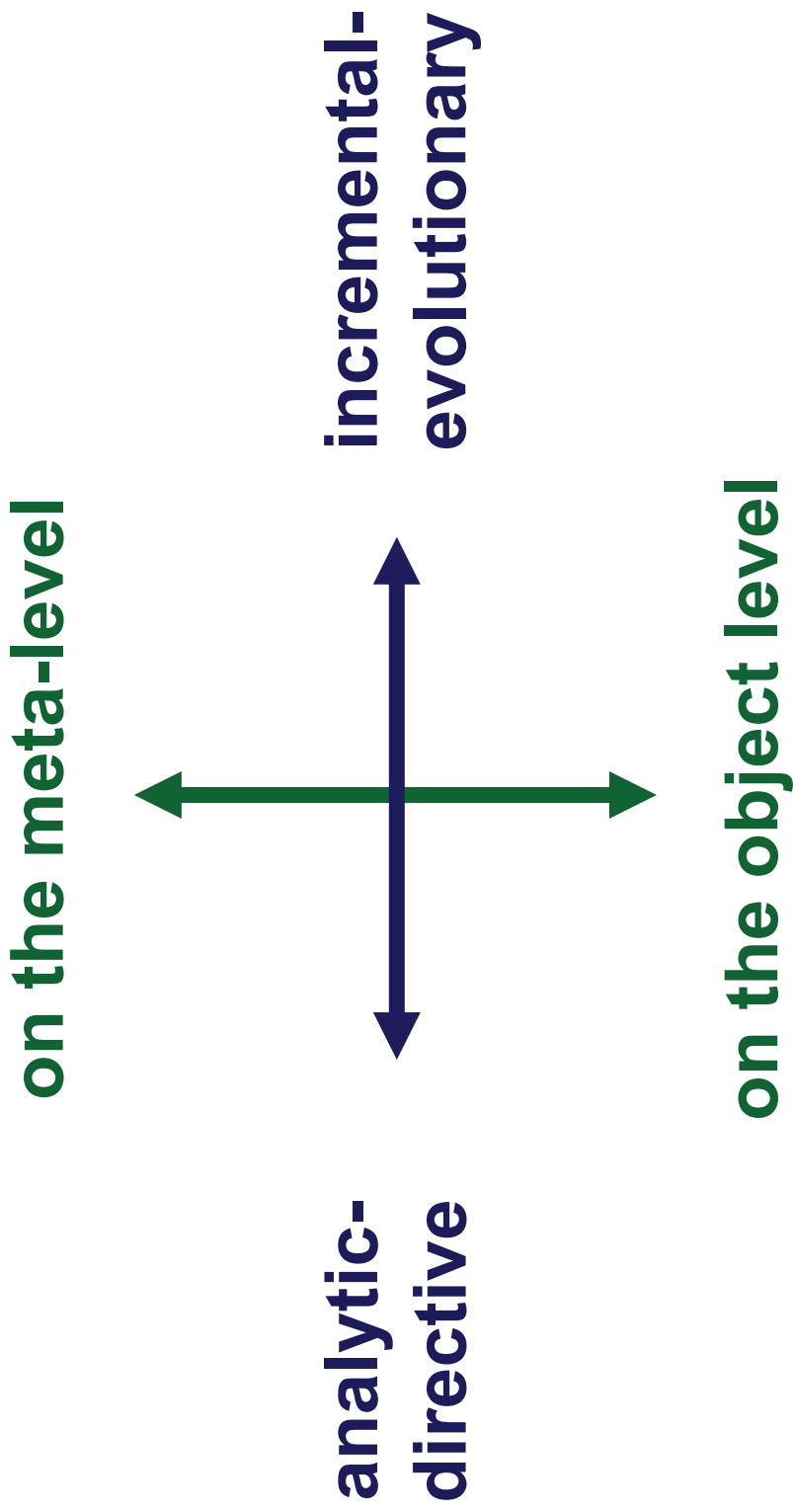
1.1 Innovations

1. Innovations in complex systems

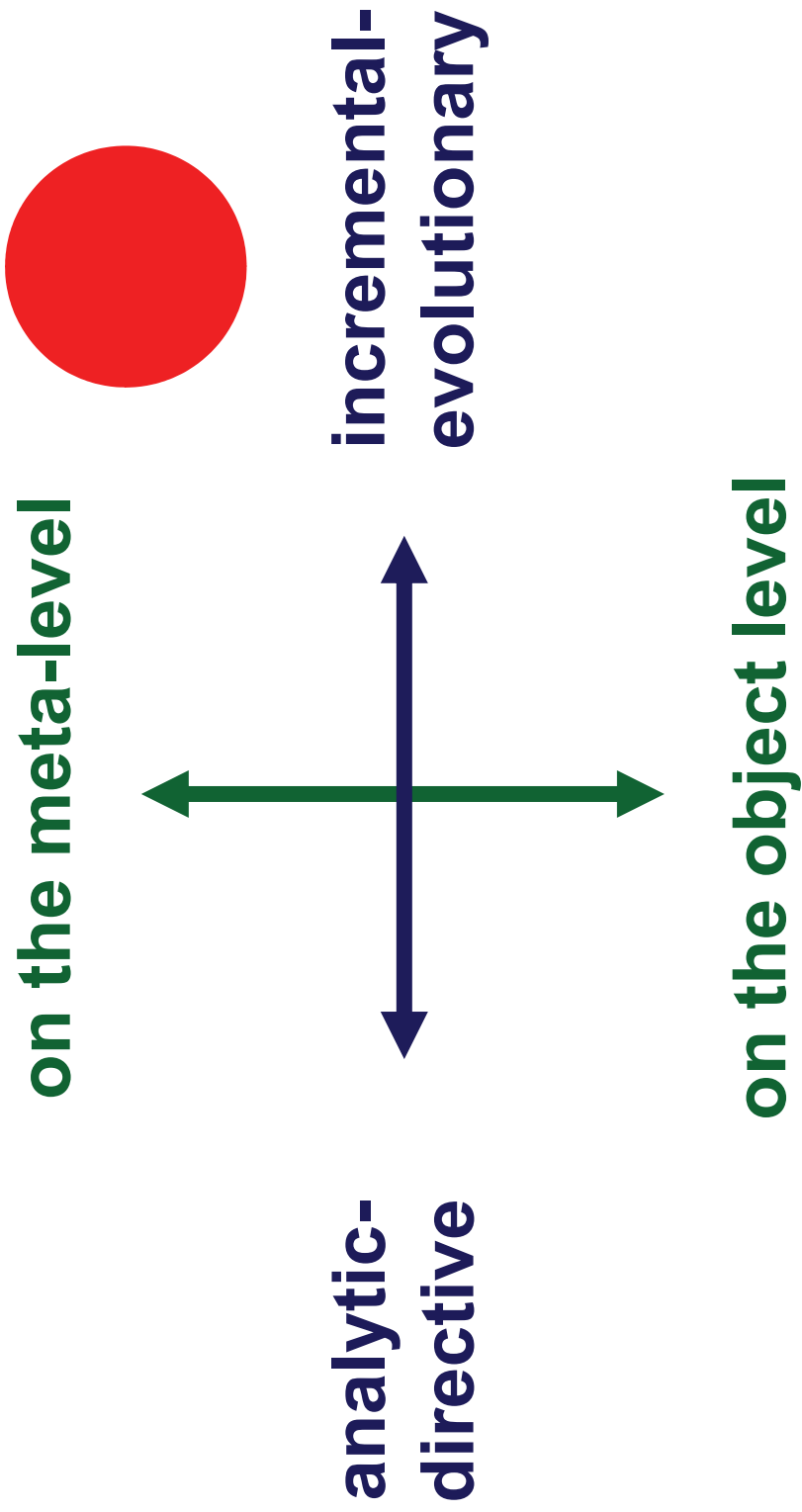
1.2 Complex systems

can potentially be in so many states
that nobody can cognitively grasp all
possible states of the system and all
possible transitions between the states

1.3 Steering complex systems



1.4 Innovations in complex systems

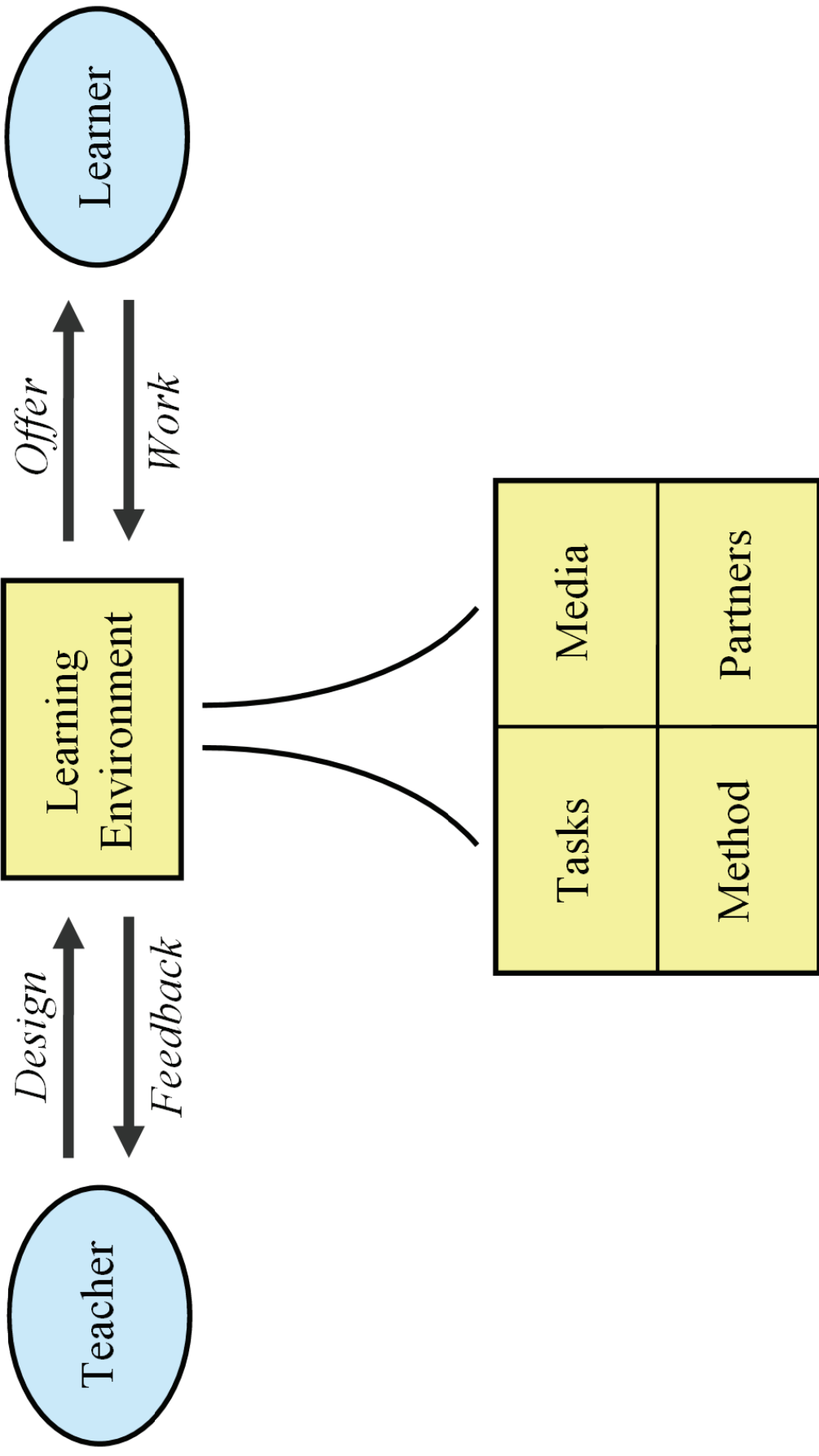


2. Learning

2.1 Aspects of Learning

- **constructive**
- **individual**
- **active**
- **self-organized**
- **situative**
- **social**

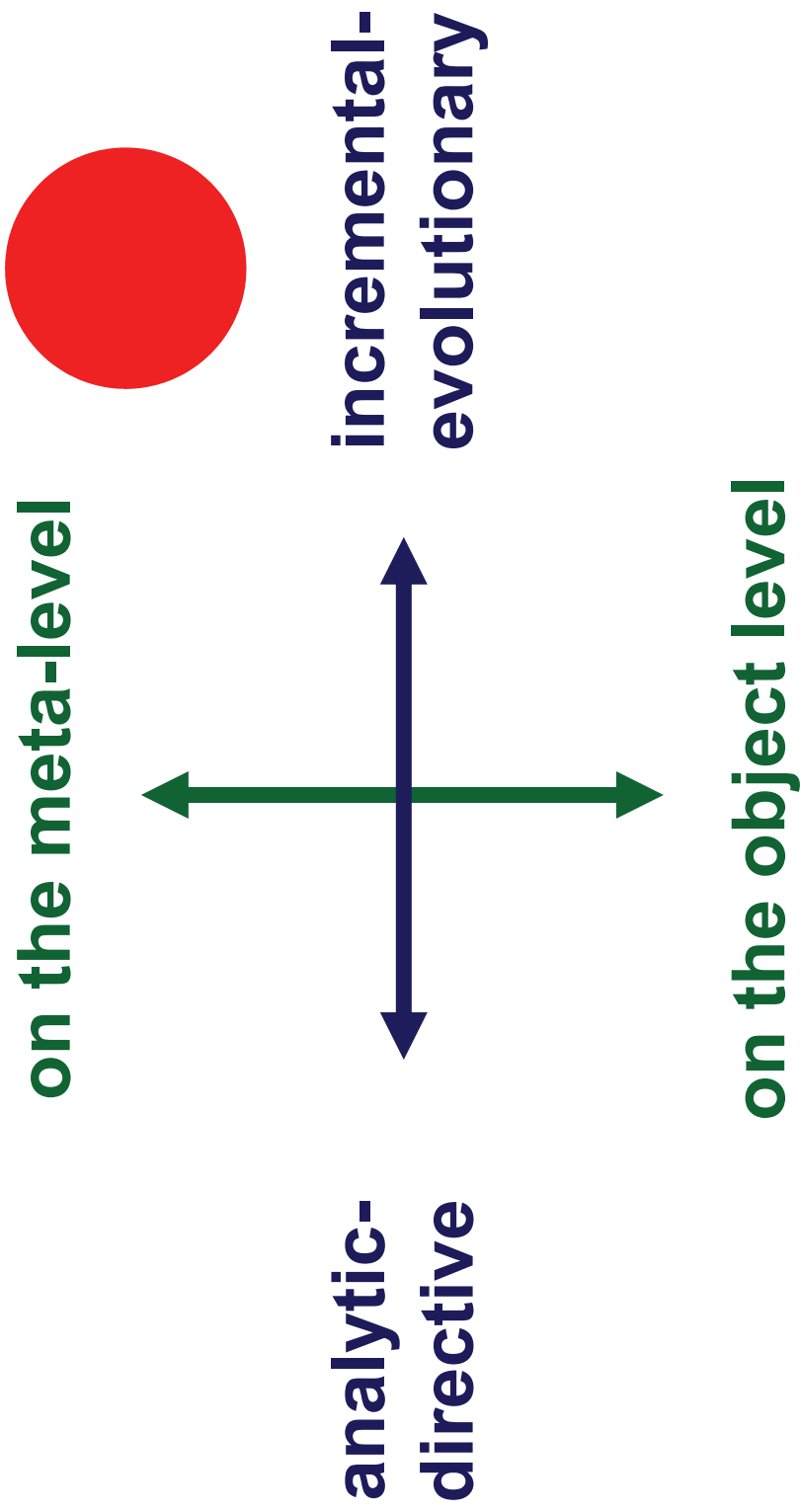
2.2 Concept of Learning Environments



3. Innovations in the educational system

3.1 A Summary

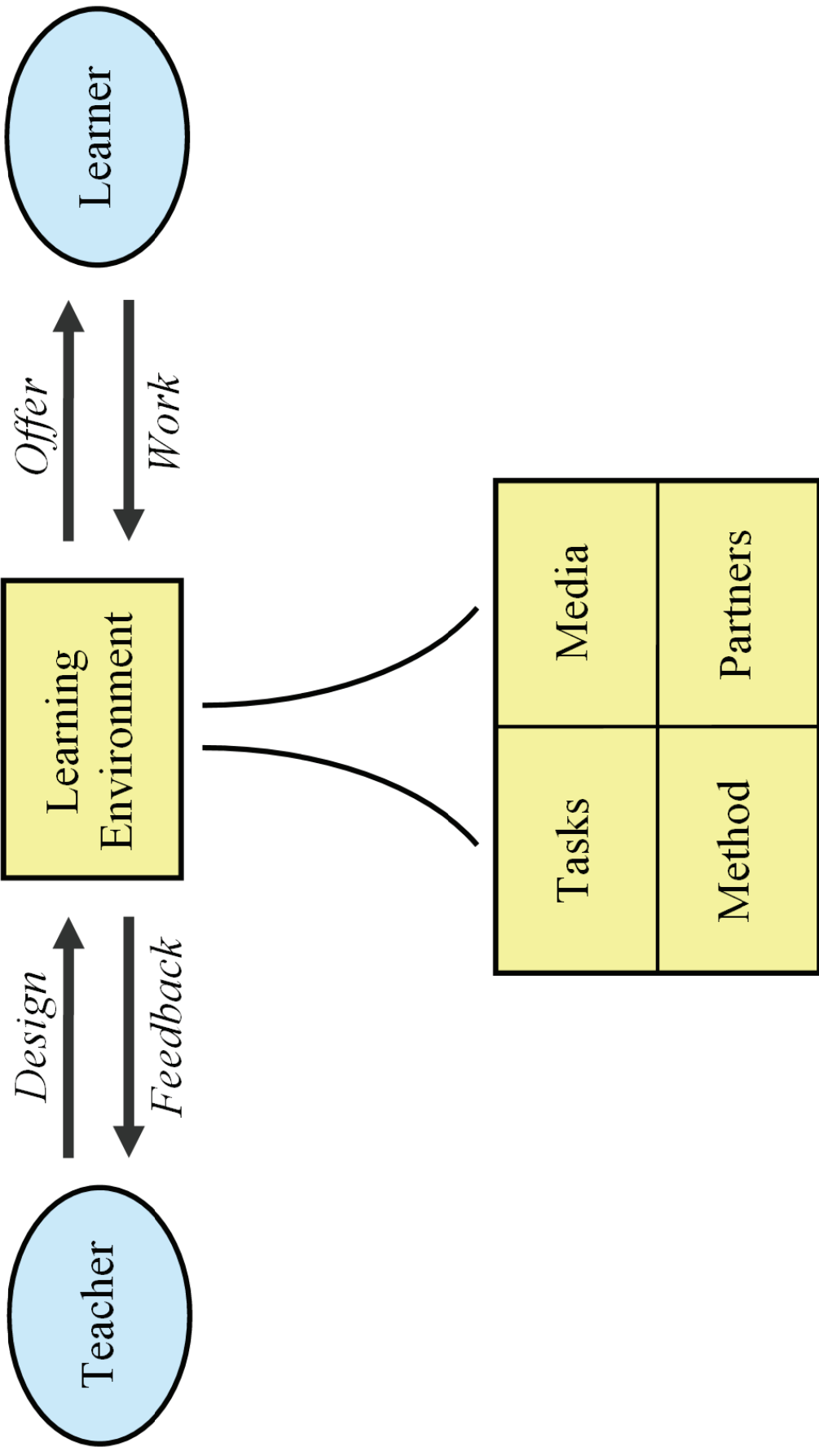
Innovations in complex systems



Aspects of Learning

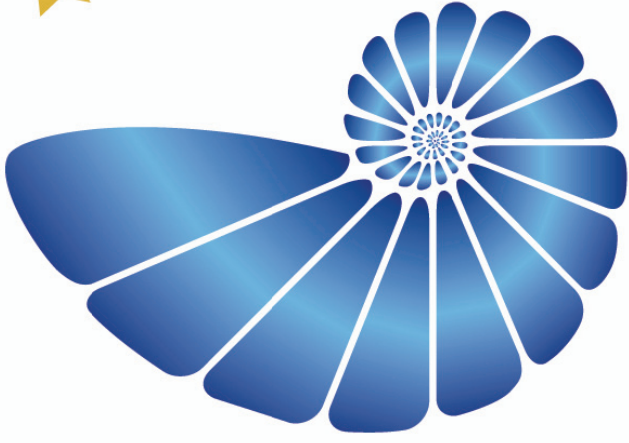
- **constructive**
- **individual**
- **active**
- **self-organized**
- **situative**
- **social**

Concept of Learning Environments



3.2 Pattern for innovation projects

- **aiming at teachers**
- **networks of schools**
- **main areas of innovation**
- **meta-level of beliefs**
- **development of learning environments**
- **Universities as innovation centres**
- **(inter-)national teacher education**



The Fibonacci Project

DISSEMINATING INQUIRY-BASED SCIENCE
AND MATHEMATICS EDUCATION IN EUROPE

