# OntoEdu:

Ontology-based Education Grid System for E-learning

**Cui Guangzuo**
cgz@pku.edu.cn
Modern Education Technology Center
Peking University



## Main topics

1. Introduction of Education Platform
2. OntoEdu Architecture
3. Implementation of OntoEdu
4. Practice
5. Conclusions and Future Works

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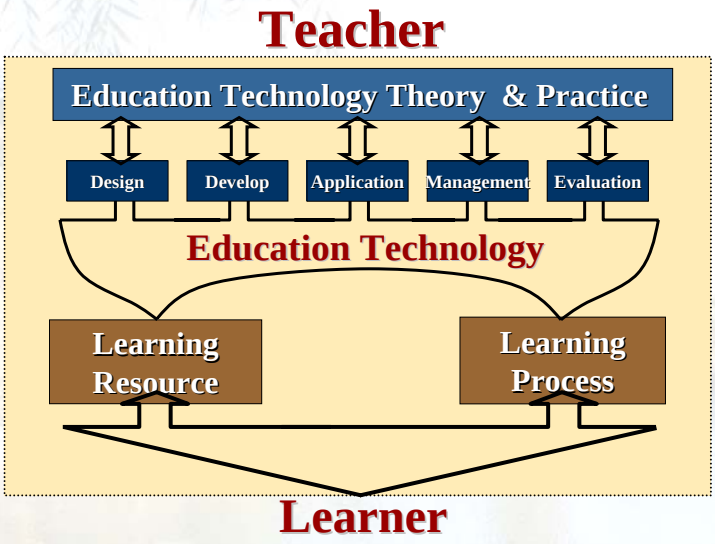
# 1. Education Platform (EP)






# Problems with EP

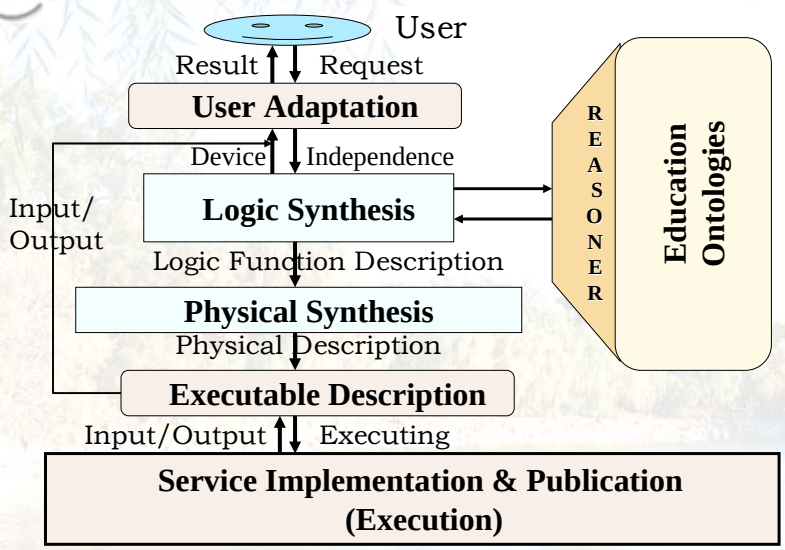
- EP is a kind of software System
- EP serves for education
- EP depends on
  - Information Technology
  - Education Theory
  - …
- Any improvement of above technologies will change EP
- Such as mobile devices, knowledge processing, m-learning …

# Perspective to EP

- The change of EP means:
  - Resources rebuild
  - System redesign
  - Modules recoding
  - Education Technology retraining
  - Learning mode retraining
- ... too large work of wasting!
- How to avoid these wasting?
- ---which will be dealt with in my talk.
- Proposed a new EP architecture call OntoEdu---Ontology-based education grid system



# 2. OntoEdu Architecture



## 3. Implementation

- User Adaptation
- Education Ontology
- Logic Synthesis
- Physical Synthesis
- Executable Description
- Service Implementation & Publication



## User Adaptation

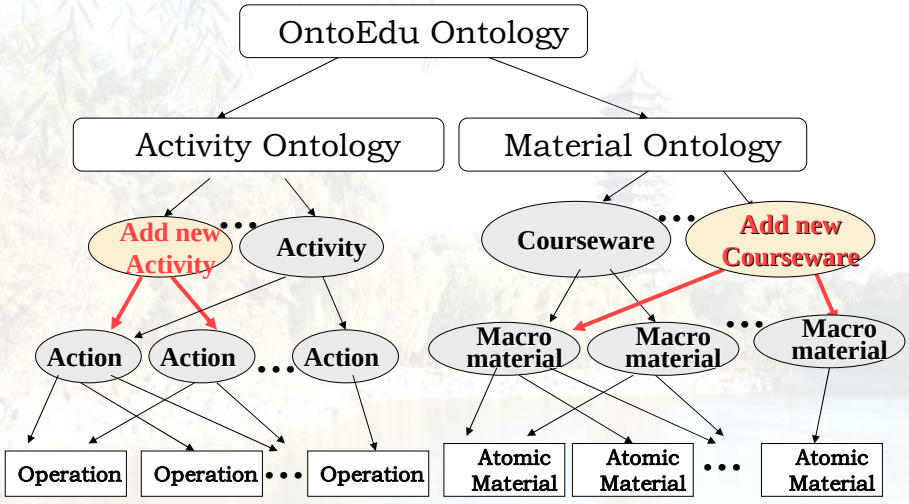
- Format Transfer between PIO (Physical Input/Output) and LIO (Logic Input/Output)
- Physical Input/Output means Device Dependent IO
- Logical Input/Output means Device Independent IO

# Education Ontology

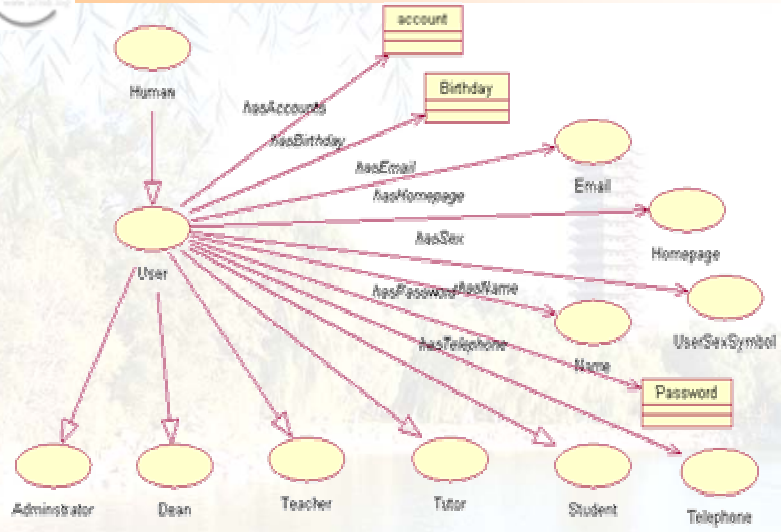
- **Design Goal**
  - Knowledge Representation for Generating new education activity automatically without redesign and recoding
  - Increase knowledge conveniently
  - Implement with OWL language
- **Including (in our project)**
  - Activity Ontology
    - Education Activity and its relations
    - Such as examination, homework management, Instruction management…(predicates)
  - Material Ontology
    - Education information resource units and its relations (Objects)



# How to avoid redesign and recoding

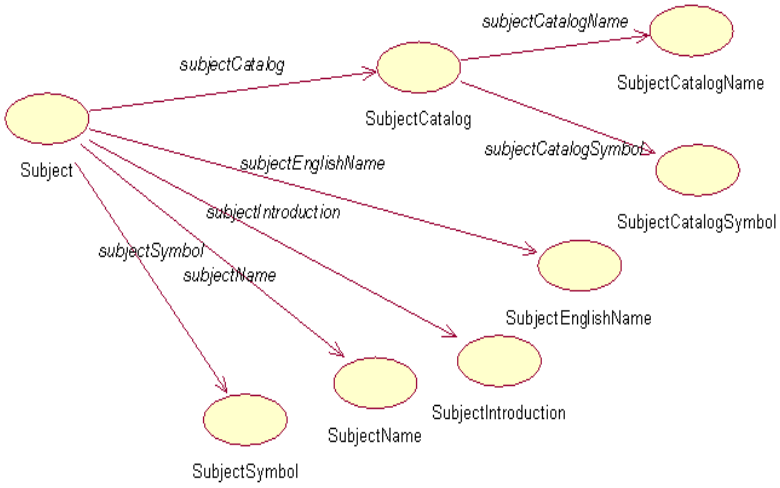


# Concept example: users






# Course Concept (raw)

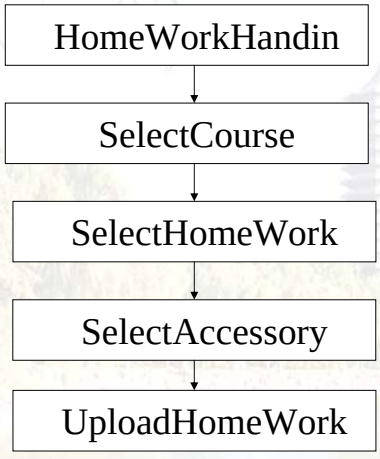


# Activity Ontology (AO)

- Activity Ontology should include knowledge about domain Activity with which the pre-specified functions should be produced.
- Information amount of AO should be as less as possible
- The knowledge representation should be convenient for reasoning



# Homework activity model




**The activity process should be described by educationist.**

## Logical Synthesis

- Generating logic function description (LFD) according to the user request by using ontology
- The LFD description is independent of where and how to execute
- Like simple workflow description
- In our project, we adapt OWL-S process model



## Physical Synthesis

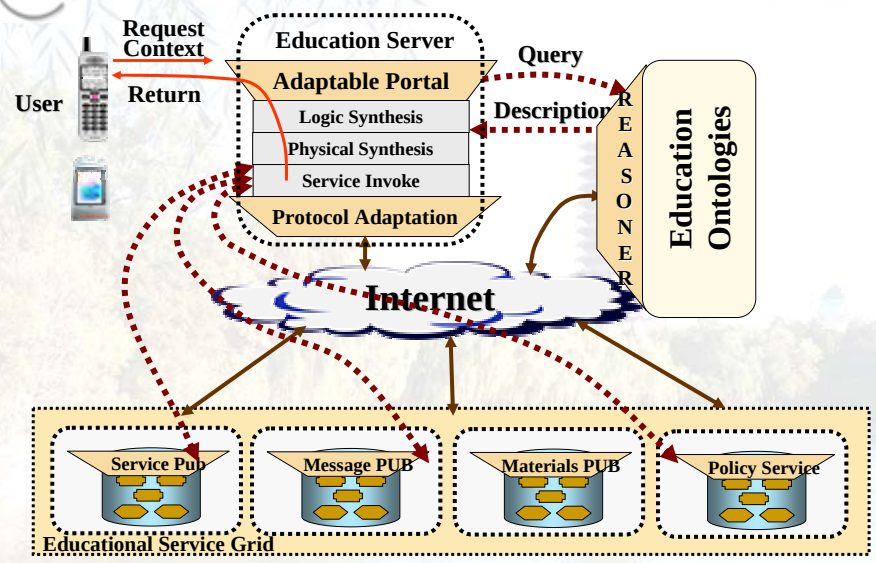
- Generating executable description of LFD
- Decide how and where to execute
- Include service discovery and service composition
- Implement with OWL-S language

## Service Implementation & Publication

- This the truly real operation which is executed in EP
- It must be published with a convenient way to be discovered easily
- Implemented with semantic Grid
- A kind of Grid whose services are described with education semantic



## 4. Practice: demo



# Device Adaptation


Handheld Platform PDA Platform PC Platform



# 5. Conclusions and Future Works

- Ontology is the core knowledge of education platform
- Concept reuse could be realized by education ontology
- Ontology is also the core technique of semantic Grid
- Ontology optimization and Logic application will be our next work


Thanks!
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