

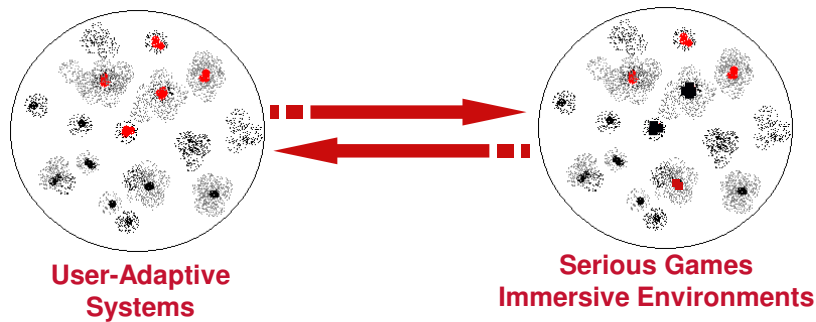
# User-Adaptive Systems and Serious Games: Synergy of Two Worlds

Vania Dimitrova

<http://www.comp.leeds.ac.uk/vania/>

V.G.Dimitrova@leeds.ac.uk

## Synergy of Two Worlds



## About me

### Artificial Intelligence

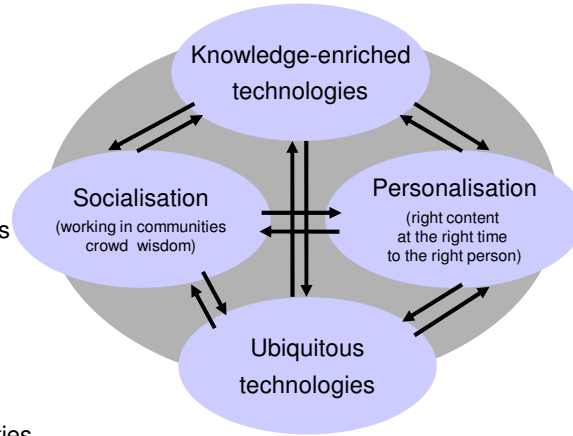
- Knowledge Representation and Reasoning

### User-adaptive systems

- Smart systems that automatically tailor their behaviour to meet user needs
- Use Artificial Intelligence techniques

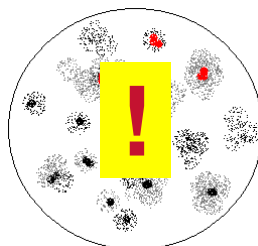
### My research

- Modelling individuals
- Modelling groups/communities
- Modelling context
- Adaptive support

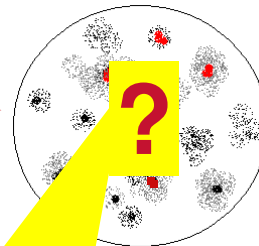


### Research Directions

## My Knowledge of the Two Worlds



User-Adaptive Systems



Ubiquitous Games

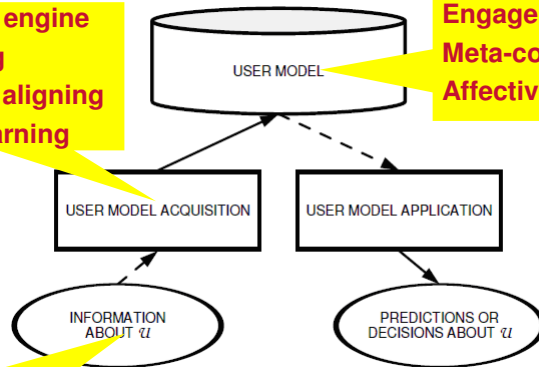
David Worthley [SG@ECTEL09]

- Personalisation
- Self-directed search and discovery
- Fidelity (realism)
- Persistent memory

## General Architecture of User-Adaptive Systems

Rule-based engine  
Data mining  
Knowledge aligning  
Machine learning

Knowledge & Skills  
Engagement/motivation  
Meta-cognitive ability  
Affective state/mood

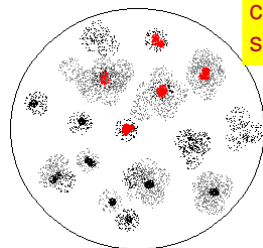


Tests/Assessment  
Log/interaction data  
Dialogue  
Sensors

Anthony Jameson, Adaptive Interfaces and Agents, J. A. Jacko, & A. Sears (Eds.) (2003). HCI handbook, Mahwah, NJ: Erlbaum.

## Synergy of Two Worlds (cont.)

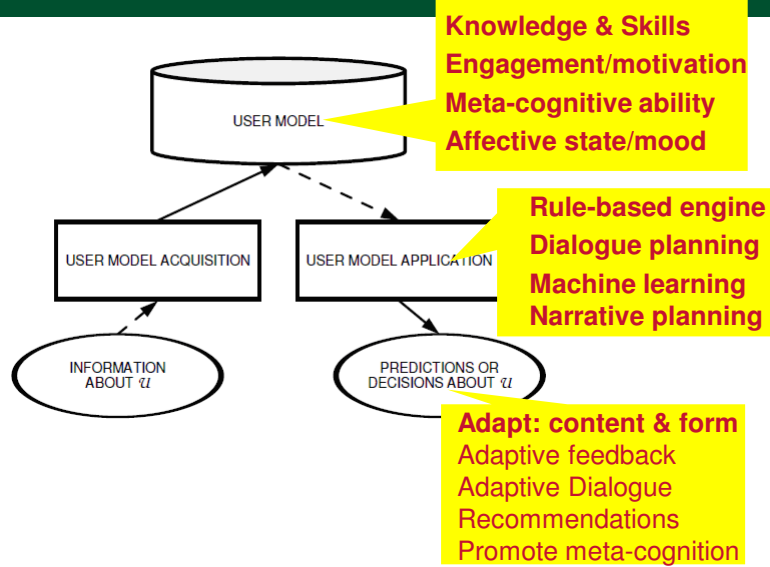
Better understanding of the user:  
cognitive, meta-cognitive,  
social, affective aspects



User-Adaptive Systems

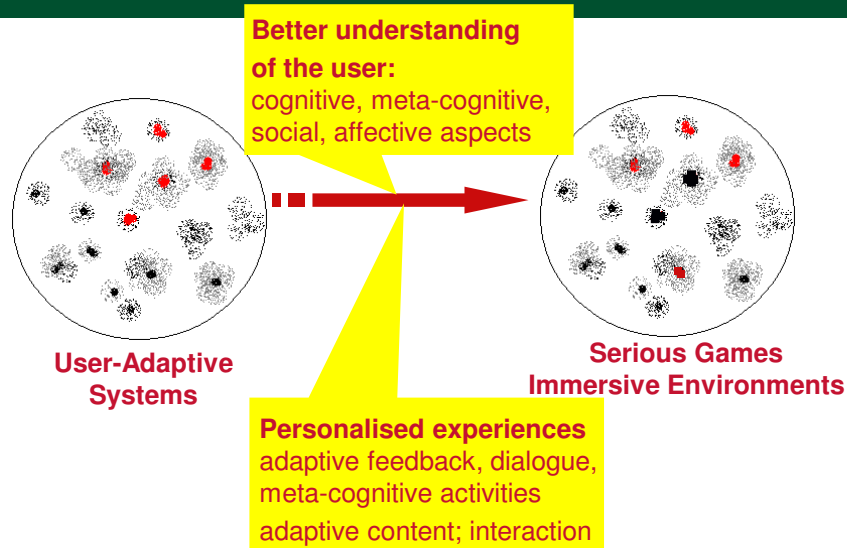
Serious Games  
Immersive Environments

## General Architecture of User-Adaptive Systems



Anthony Jameson, Adaptive Interfaces and Agents, J. A. Jacko, & A. Sears (Eds.) (2003). HCI handbook, Mahwah, NJ: Erlbaum.

## Synergy of Two Worlds (cont.)



## Adaptivity is Intrinsic in Games

### Open user model

- You see where you are and what you've achieved

### Enforcement learning

- Tutoring approach

### Making decisions on behalf of users

- Decision trees; association rules

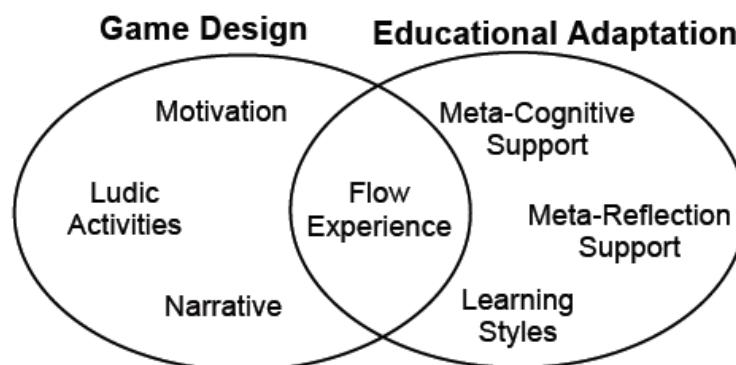
### Adaptive content presentation

- Different introductions; levels

### Affective modelling

- Thrill, engagement, motivation

## Adaptation in Educational Games



Peirce N., Conlan O., Wade V. (2008). Adaptive Educational Games: Providing Non-invasive Personalised Learning Experiences. In: Digital Games and Intelligent Toys Based Education, 2008, pp. 28-35.

# Macro & Micro adaptation

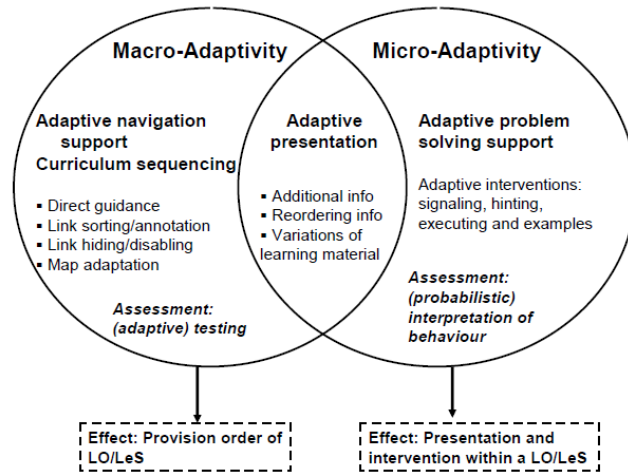
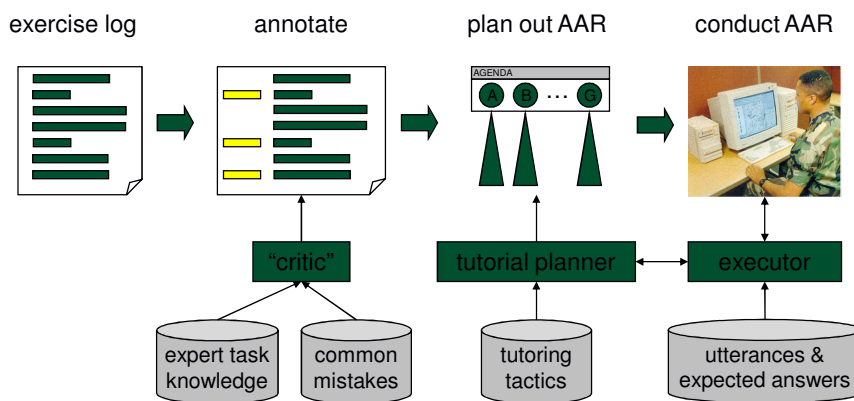


Fig. 1. Macro- and micro-adaptive techniques  
(NB: LO = Learning Object, LeS = Learning Situation)

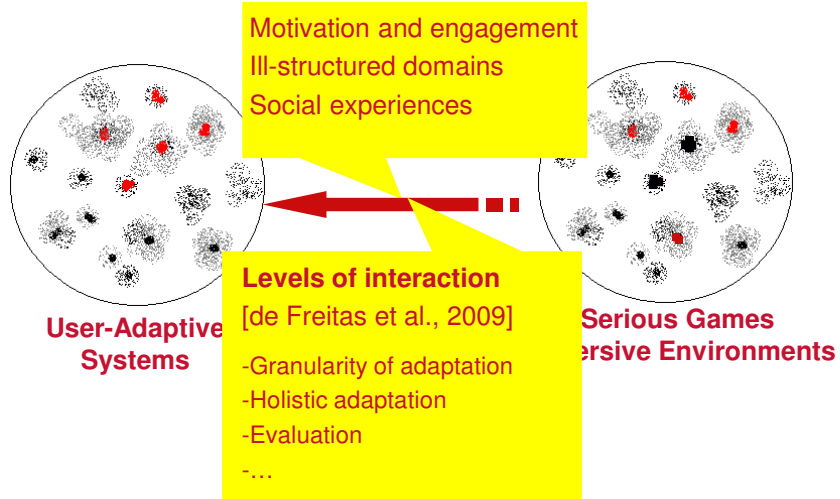
Law, E. L.-C., & Kickmeier-Rust, M. D. (2008). 80Days: Immersive digital educational games with adaptive storytelling. In Proc. of the First International Workshop on Story-Telling and Educational Games (STEG'08)

# Reflective Tutoring

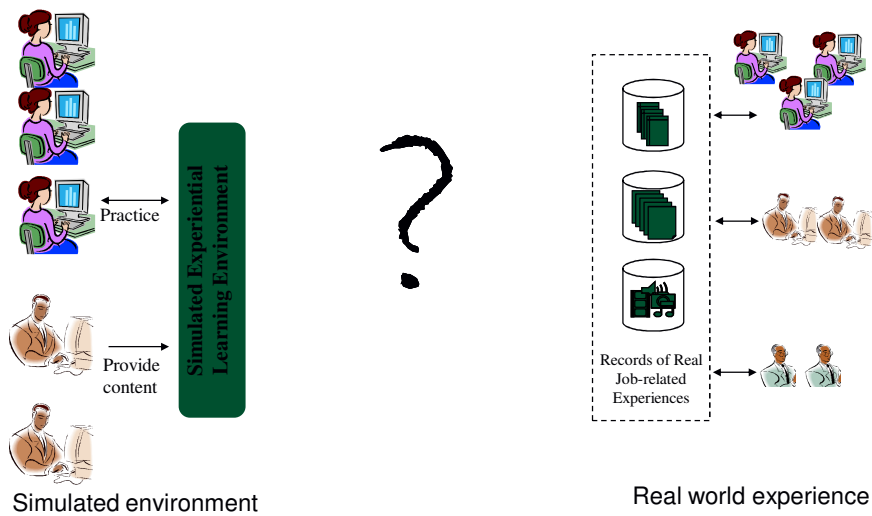


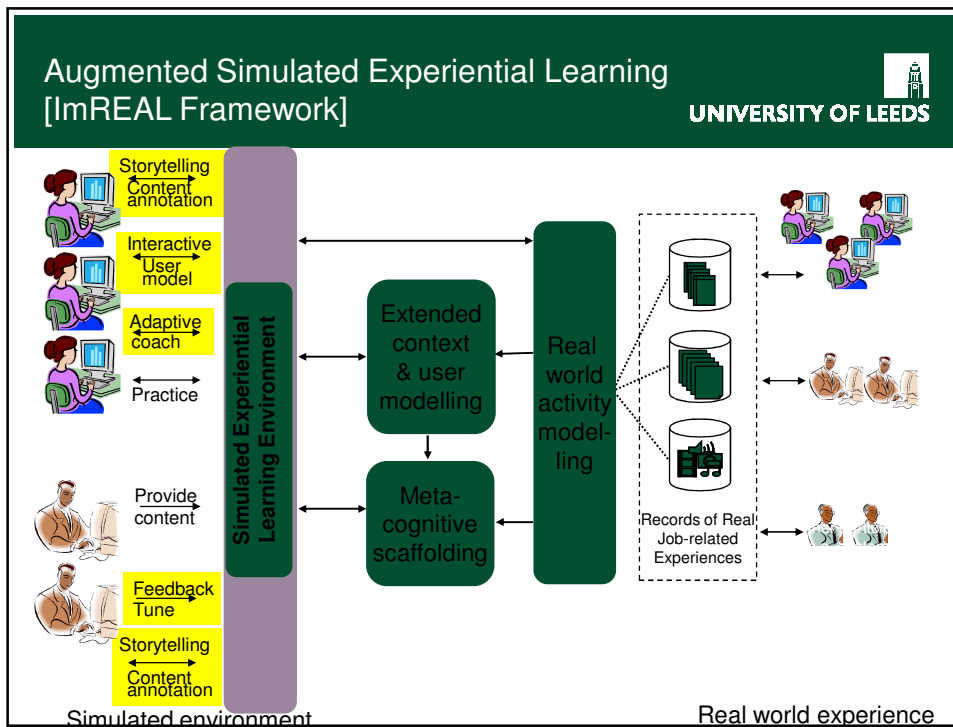
Chad Lane, Winning and Learning: Making the link between domain content and game success explicit, Workshop on ITS & Games, 2006

# Synergy of Two Worlds (cont.)



# Augmented Simulated Environment





**Take Home Message**

UNIVERSITY OF LEEDS

**Synergy of Two Worlds**  
**We now CAN and SHOULD**  
**Many opportunities; Exciting Challenges**

**A holistic approach is needed**

**Researchers (User-adaptive Systems; Games)**  
**Domain Experts (Adaptation, Realism, User Behaviour)**  
**User Communities (Rapid Testing; Discover New Usages)**  
**Technology Developers**  
 ...

**User Adaptive Systems**      **Games and Immersive Environments**