



**TERENCE**



# The Learners' User Classes in the TERENCE Adaptive Learning System

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<http://www.terenceproject.eu>



# The TERENCE Project

TERENCE is a 3-year EU project developing an **adaptive learning system** (ALS) for

*(overall goal)* improving the **reading comprehension (RC)** of

*(learners)* text **poor comprehenders**, hearing and deaf,

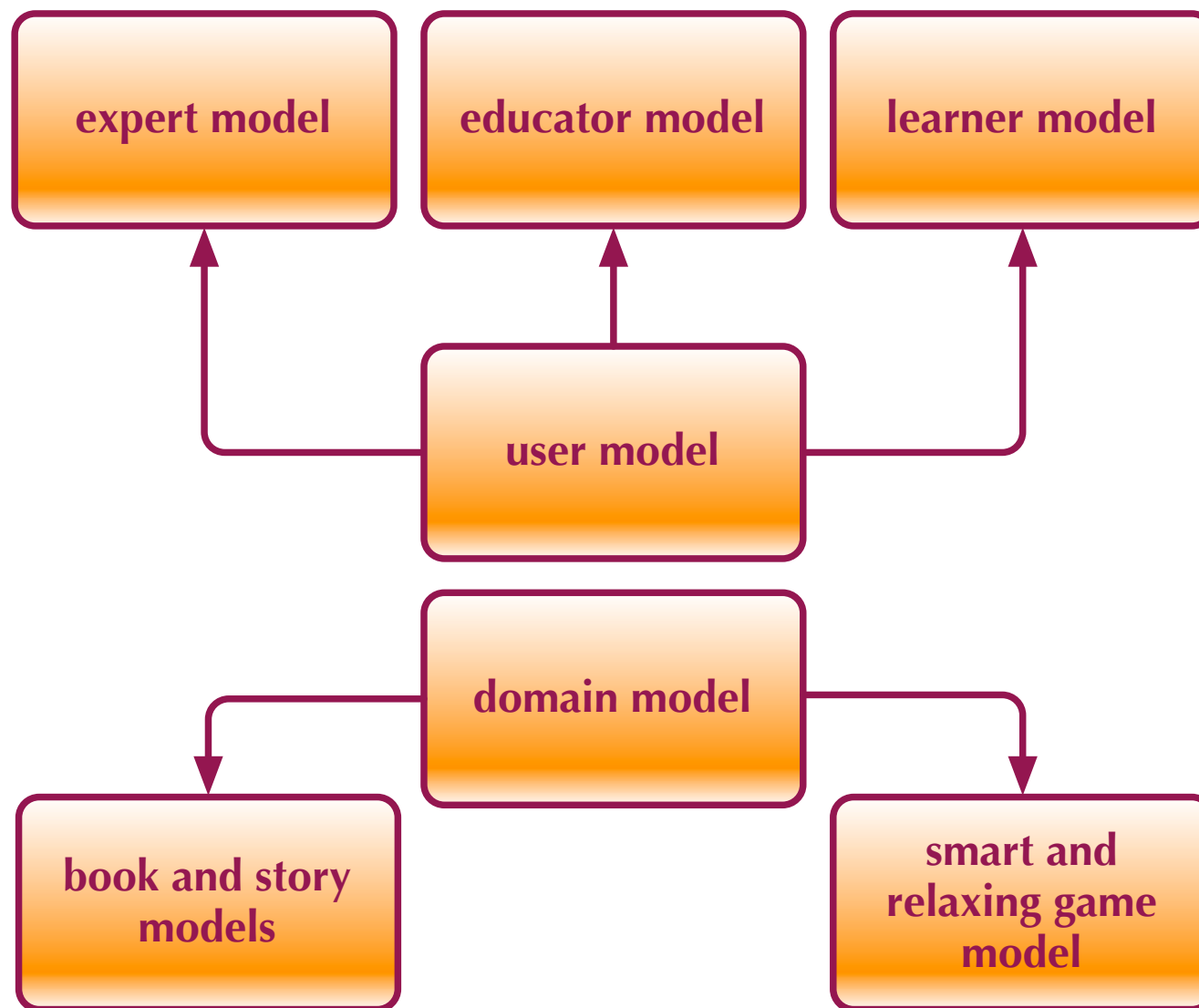
7-11 year old, in Italy and UK,

*(educators)* with the assistance of their **educators**,

*(material)* by reading **books of stories** and resolving **games**

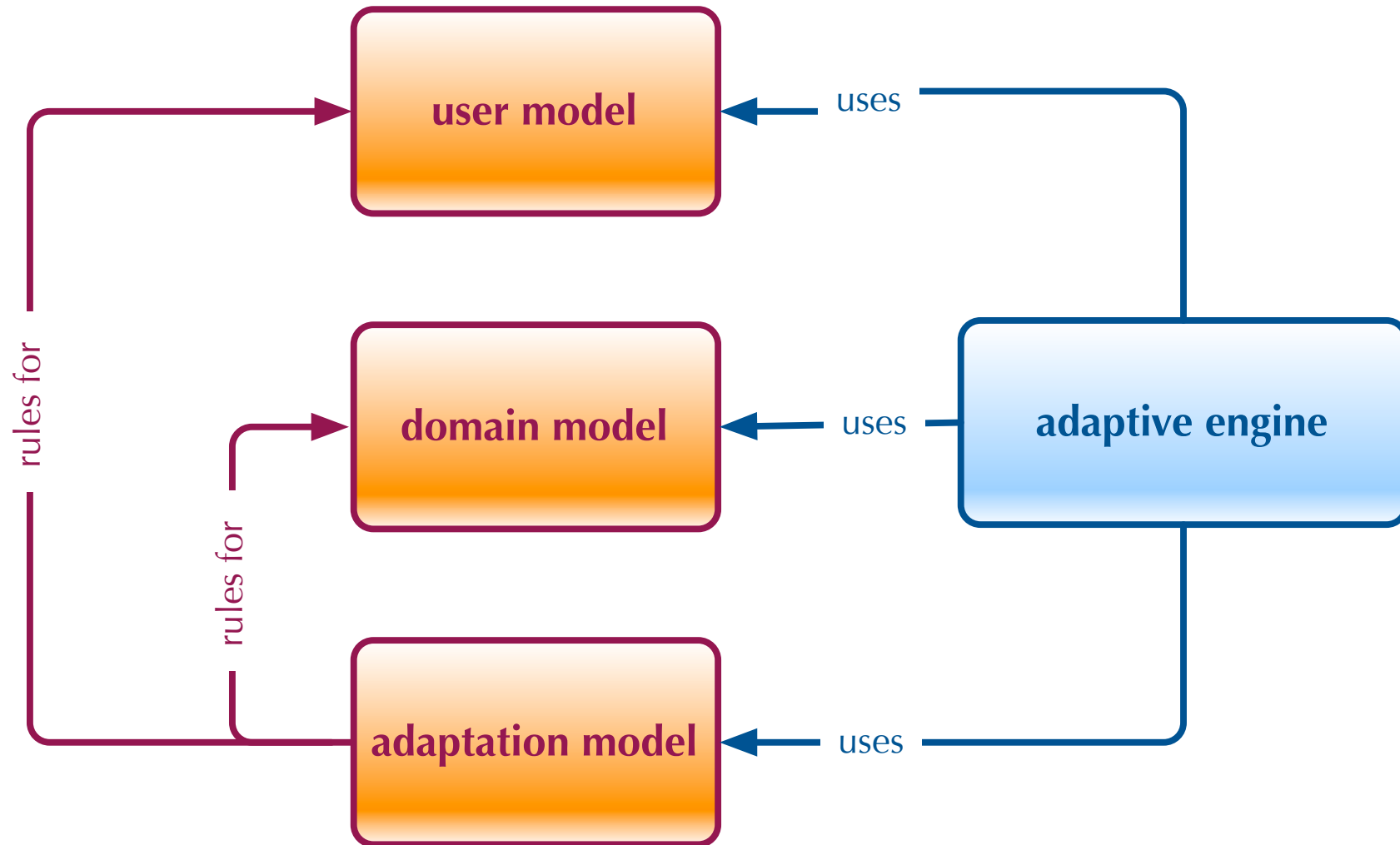


# The TERENCE ALS





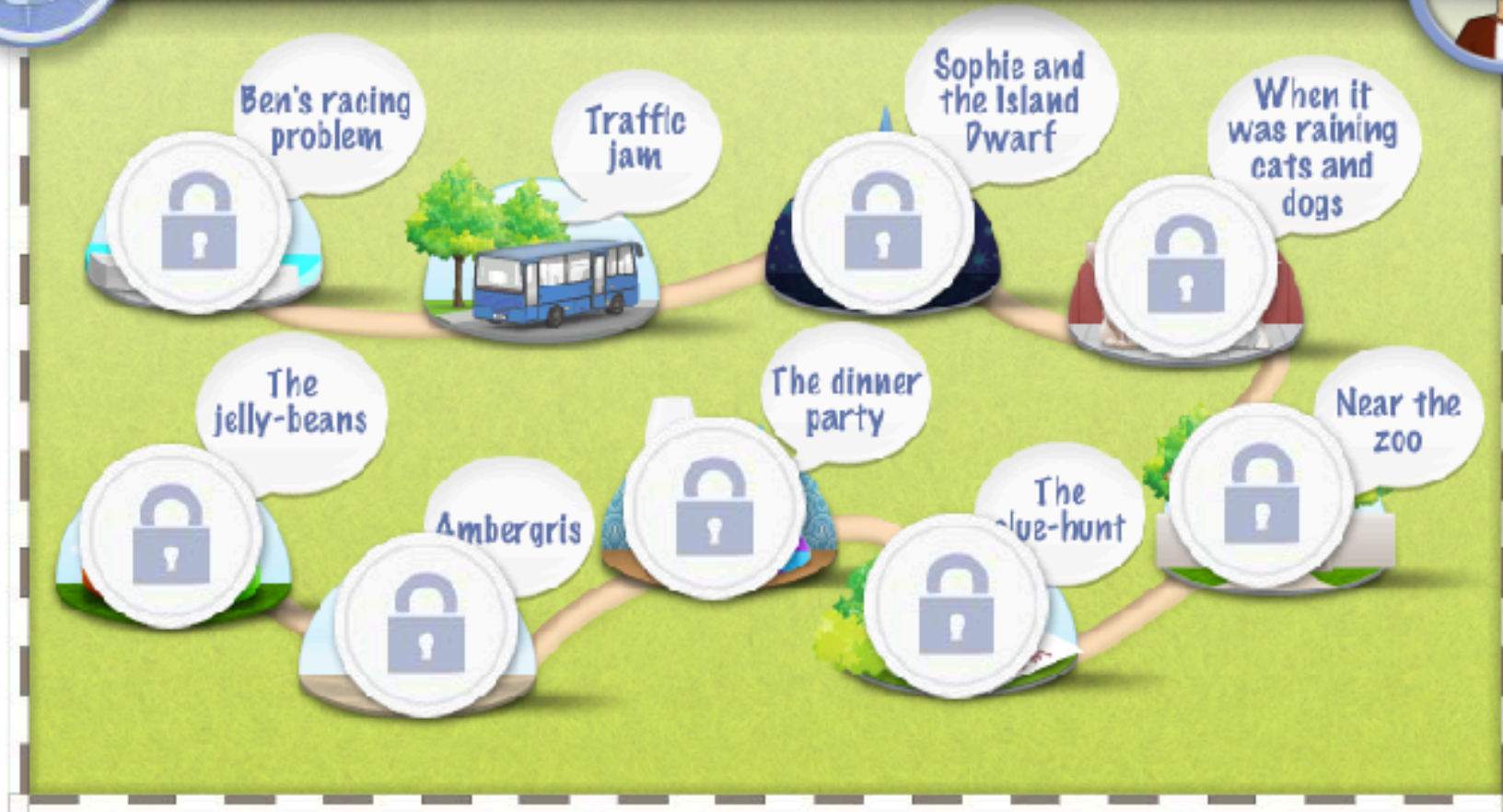
# The TERENCE ALS





## CHOOSE YOUR STORY

# The TERENCE ALS





how did we  
get there?



# The TERENCE Project

TERENCE is a 3-year EU project aiming at an **adaptive learning system** (ALS) for

*(overall goal)* improving the **reading comprehension (RC)** of  
*(learners)* text poor comprehenders, hearing and deaf,...

*(material)* by reading books of stories and resolving games,

*(methods)* designed following the  
**user centred design** (UCD) and  
evidence-based design (EBD).



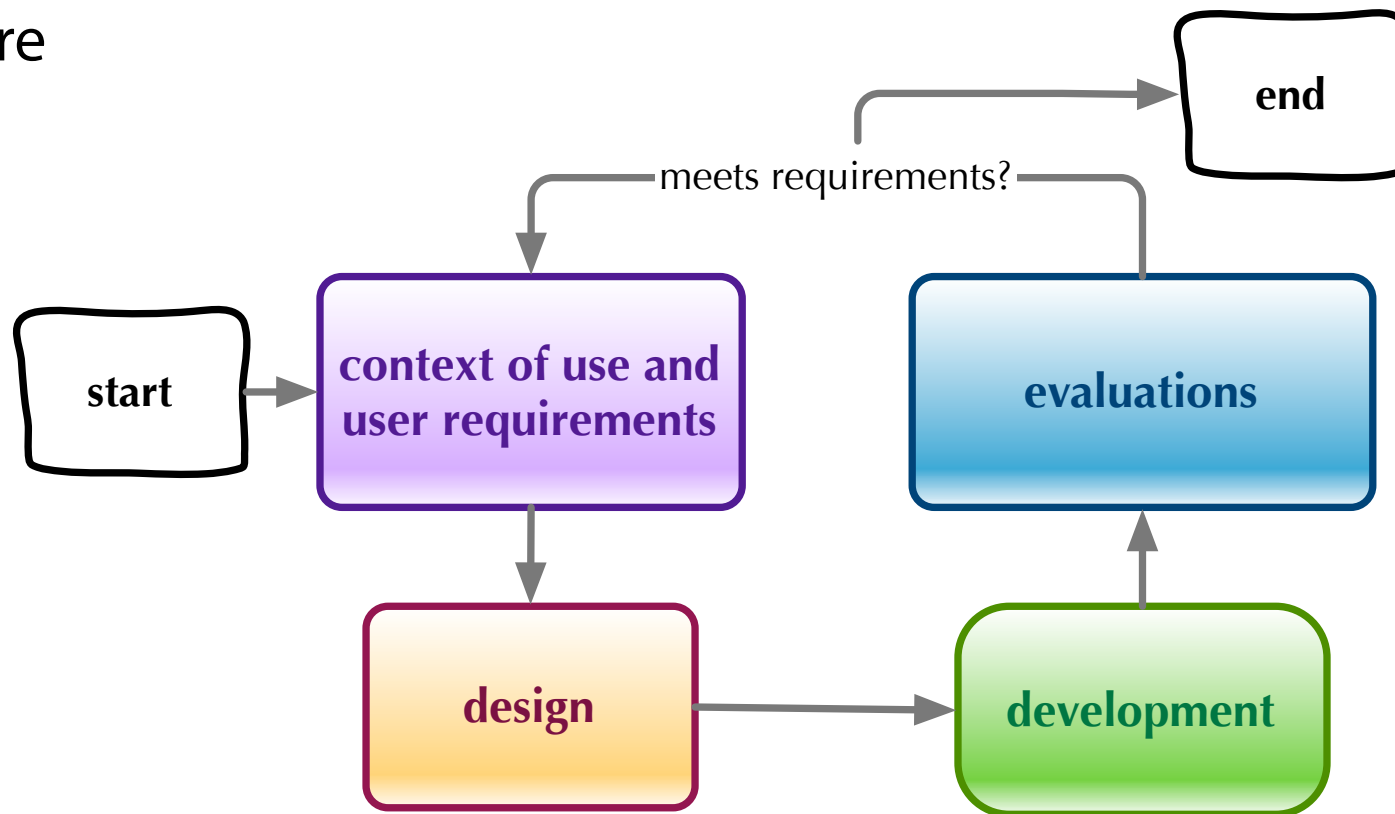
# UCD Life Cycle Model



UCD is based on the ISO 13407 standard and requires:

- users (e.g., learners) at the centre

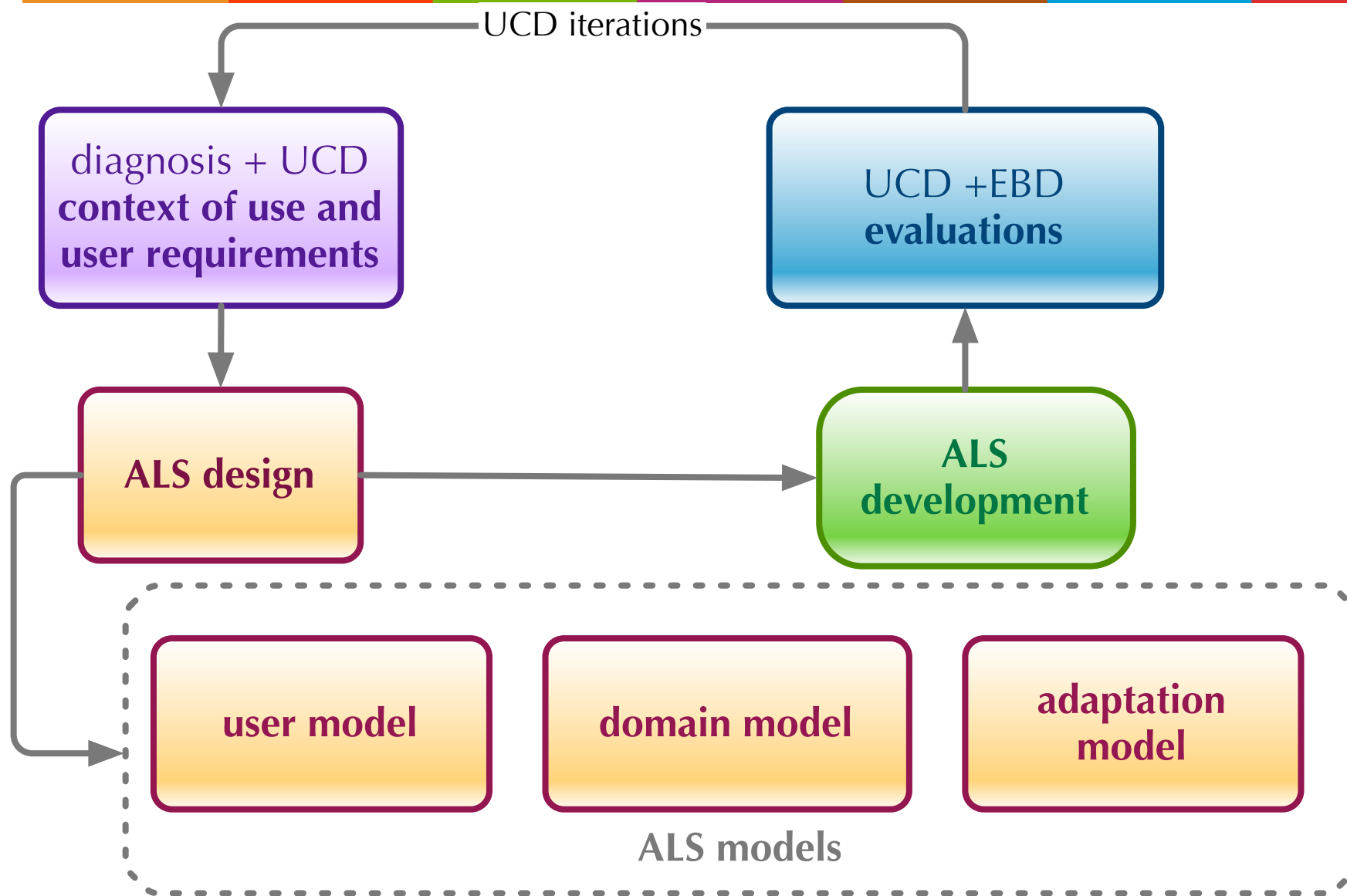
- an incremental and iterative design
- a highly multi-disciplinary team





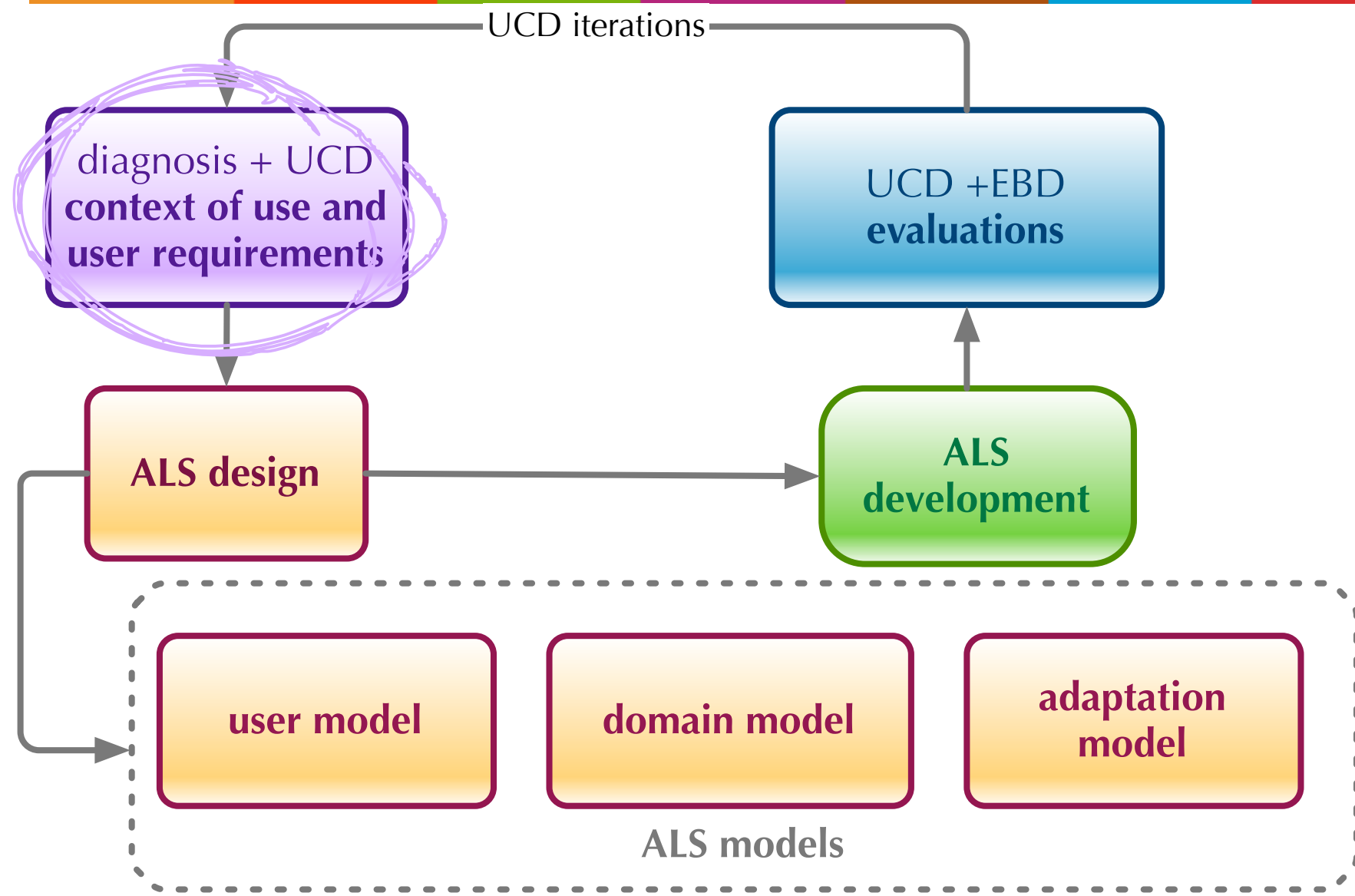


# Structure of the Project



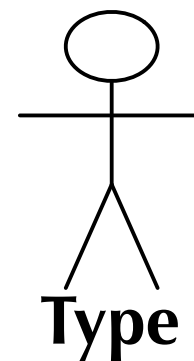


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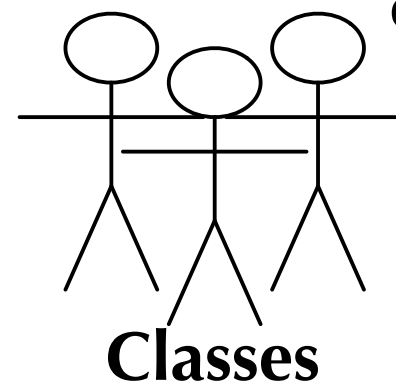


# From Types to Classes

- Once upon a time, there were certain **types** of learners...
- and in the end of the analysis, we had learner **classes**

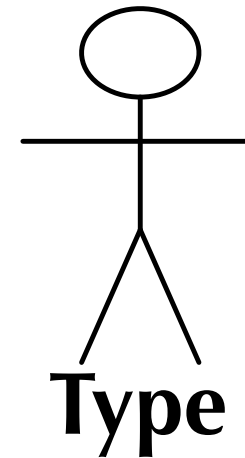


- interaction  
- reading  
comprehension



# From Types to Classes

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- and in the end of the analysis, we had learner **classes**





# The TERENCE Learner Types

- The TERENCE **learners** are 7-11 year old children, **hearing** and **deaf poor comprehenders**, who
- fail to comprehend the relations conveyed by cohesive devices such as temporal **connectives**
  - have problems with **inference-making** from distant parts of a text,
  - fail to detect **inconsistencies** in texts
  - but have low level cognitive skills like decoding



# The Learner Data for Classes

- ▶ **Data:** the main data are from for RC skills and UCD for interaction
  - ▶ brainstorming meetings and inquiries with experts
  - ▶ UCD and diagnosis field studies
- ▶ **Participants** in the field studies
  - ▶ 282 *learners* in Italy and 226 learners in UK, aged 7-11
- ▶ One of the main **goals:**
  - ▶ requirements concerning RC and *interaction*

# RC Skills of Poor Comprehenders

R C	Higher Level	Lower Level
	S K I L L S	Global coherence
Integration (global)		
Local cohesion		Inference-making (local)
		Integration (local)
		Cohesive devices (local)
Lexical skills		...

# Example Data Gathering Activity

## Console Activity

Goal:	to learn about their favourite consoles and game consoles.
Description:	learners have sheets with stickers for game consoles and a map. They put the sticker of their favourite console in the centre of the map, and answer the questions on the map, e.g., (1) where do you play this?, (2) why do you play with this?
Material:	stickers; sheets





# Example Data Gathering Activity

Character Activity	
Goal:	to learn about their favourite game characters or avatars
Description	each learner, in turn, chooses a card from the container; learners are asked their opinion about the extracted characters
Material	character cards; container

CARDS



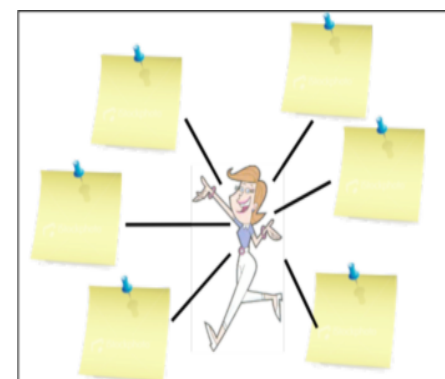
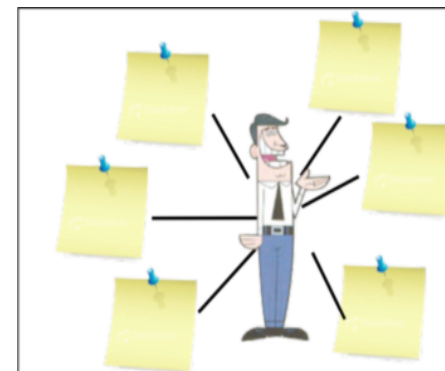
# Example Data Gathering Activity

## Interaction with Parents Activity

**Goal:** to learn about what they do with their parents

**Description** learners received a sheet with a picture of a mum, and another with that of a dad. They were asked to list six (or less or more) activities they often do together with their mum or dad

**Material** post-it



# Data Analysis

- Data **management**: data were stored in a DB
- **Statistics**:  $\chi^2$  and Fisher's analysis; natural variables like gender and age were defined; other dichotomy variables were derived from statistics
- observations
- Data **analysis** for building classes: using associations of variables, we derived a first classification that stems from orthogonal dimensions (e.g., North/Centre)



# Some Learner Classes and Personas

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## Classes

## Persona

Female

Maria

Younger, rural, male

Julius

Younger, urban, male

Henry

Older, male

Andrew

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# The TERENCE Persona Framework

	PIC	Fictitious name
C H A R A C T H E R I S T I C S	Bio	...
	Personality	...
	Console technology	...
	Role in/out of class	...
	...	



# The TERENCE Persona Framework


	<b>PIC</b>	<b>Fictitious name</b>
E N V I R O N M E N T	Time with family	...
	Time with friends	...
	Homework	...

# The TERENCE Persona Framework

	<b>PIC</b>	<b>Fictitious name</b>
L I F E  S T Y L E	Outdoors activities	...
	Indoor activities	...
	Home activities	...
	Sport activities	...

# Persona

- D1.2

Characteristics	
	<p><b>Persona Name:</b> Carla.  <b>Age:</b> 11.  <b>Gender:</b> Female.  <b>Classroom:</b> III.  <b>Comprehension skill:</b> Poor Comprehender.  <b>Deaf/hearing:</b> Deaf.</p>
<b>Summary of the class represented by this persona</b>	Represents the class of children aged between 7 and 11 years old. Deaf belonging to an Italian school. Has passion for drawing. She writes every day in her secret diary. Good use of technologies for research on Internet.
<b>Personality</b>	She is polite and quiet.
<b>Role in classroom</b>	She is active, careful, and diligent.
<b>Role out of the class</b>	She is nice, responsible and kind.
<b>Console/Technology</b>	She plays with the Nintendo Wii and DS; she uses the computer to browse and chat with friends. She uses the technology alone.
<b>Socio-Cultural Level of his/her own family</b>	High.
<b>School performance</b>	She learns very easily. Differently than 2 years ago, her level of frustration is increased with age.
Environment	
<b>Time spent with family</b>	She does her homework with her parents, she spends her time with her mother and she draws and reads stories with her father.
<b>Time spent with friends</b>	She meets her cousin every day to do homework or to play with her. She goes out with her friends after her homework.
<b>Homework</b>	She does her homework in the afternoon supported by parents.
Life style	
<b>Outdoors Activities</b>	She likes to see friends regularly, she likes to going out and plays with her dog, and she likes to do shopping with her grandmother.
<b>Indoors Activities</b>	She plays with Nintendo Wii, and DS, She read, writes, and draws. She likes to play with her cousin.
<b>Home activities</b>	She read fairy tales with dad, she watch TV and she chat with her friends.
<b>Sport activities</b>	She loves walking and cycling with her mom.





how did we use  
personas in the design  
of the ALS and  
learning material?

# Bio in the Learner Model

## Relevant bio information

Age range	younger, older
Gender	male, female
Reading comprehension	4 levels
Deafness	With/without cochlear implants,...
Area	Urban, rural

# Usage for Illustrations

- Avatar design: age, gender and area affect the type of preferred avatar:
  - all, independently of their age, prefer **human-like** avatars to fantasy or animal avatars;
    - the illustrators design more human-like avatars
  - female learners definitely prefer **fantasy** avatars to animal avatars
    - the illustrators design more fantasy avatars than animal ones, etc.



# Usage for the Adaptation

- If **low RC** then provide a story at level low-medium
- If **rural** then first propose books with rural setting
- **Avatar:**
  - if female learner then present fantasy animals before animal avatars
  - if older then present photorealistic avatars as first

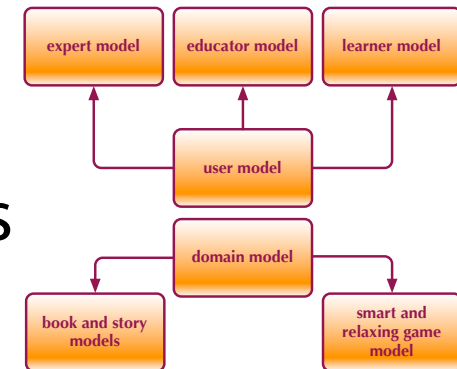
# Personality in the Learner Model

## Relevant personality traits

Takes up challenges	yes, no
Concludes work	yes, no
Attention span	high, low
Reading attitude	high, low
Frustration management	high, low

# Usage for Adaptation of Books and Games

- **Book** model, e.g.,
  - the willingness to take up challenges denotes a preference for adventure books





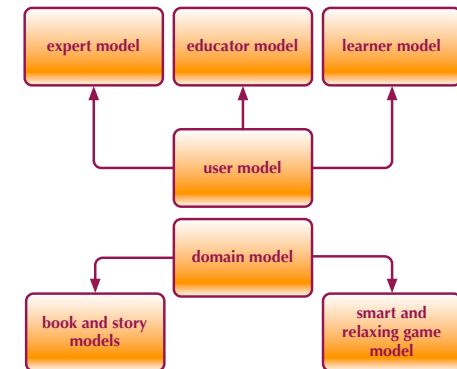
# CHOOSE YOUR BOOK



NEXT ►

# Usage for Adaptation of Books and Games

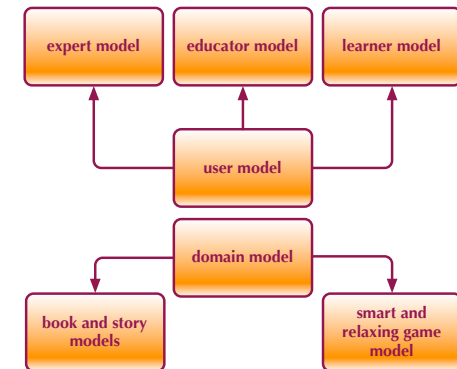
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  - the RC skill affect the levels of games and the points
  - whether the learner is willing to take up challenges and the management of frustration can affect the maximum resolution time and feedback (invited to re-read or not)





# Usage for Adaptation of Books and Games

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"TRAFFIC JAM"

## WHAT DOES SOPHIE DO IN THE STORY?

### INSTRUCTIONS

Your avatar needs help. Drag and Drop the correct image. Careful: two mistakes and you lose!

2 POINTS



Sophie sits in the back row of the bus



Sophie dives into cold water



Sophie visits the new Sport Complex



"TRAFFIC JAM"

## WHICH IS THE CAUSE?

### INSTRUCTIONS

Your avatar needs help. Choose the correct image. Careful: two mistakes and you lose!

2 POINTS



The passengers do not remove Anabel from the roadside



**Cause**



**Effect**



The dog stands right in front of Anabel



Sophie sits in the back row of the bus



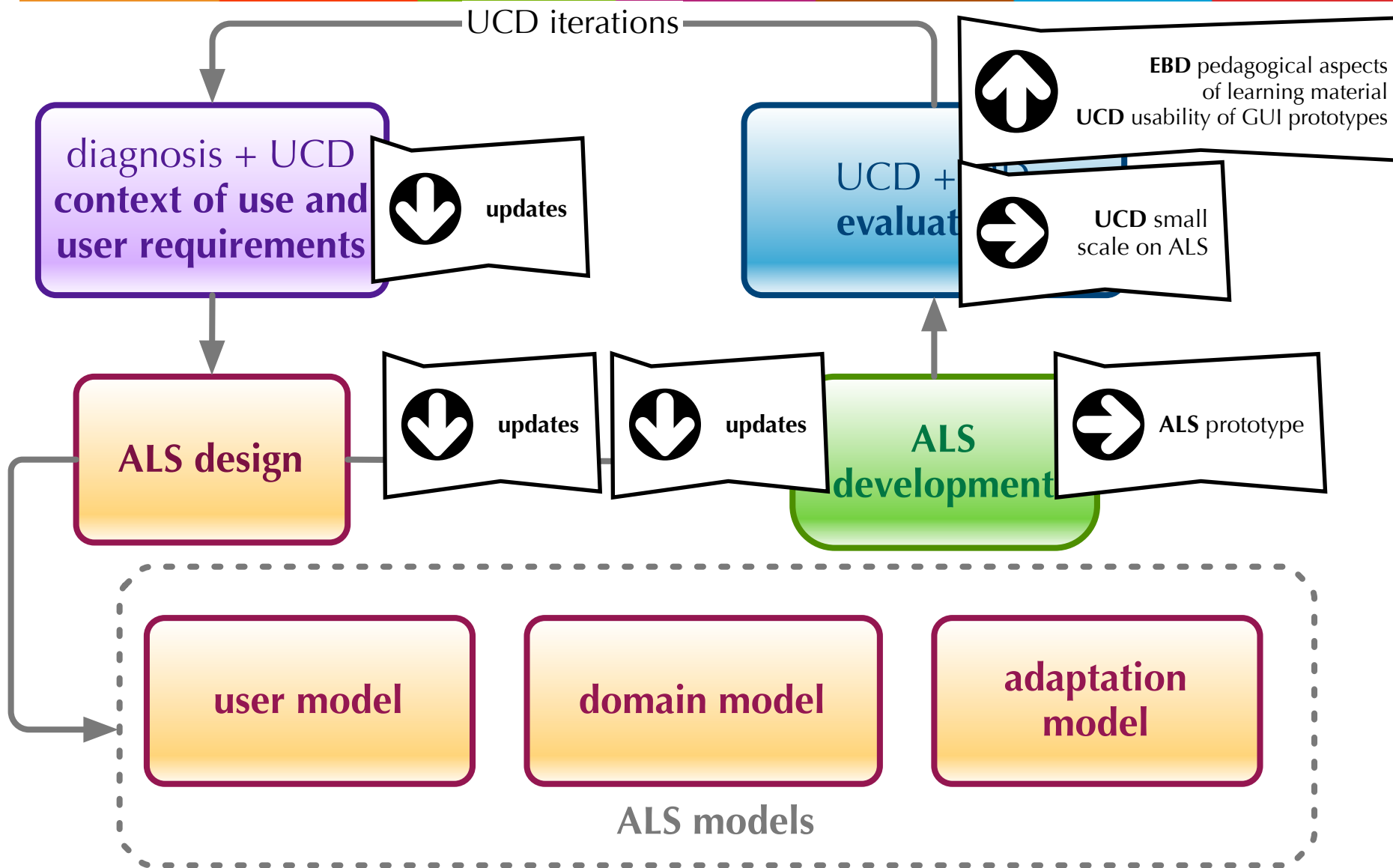
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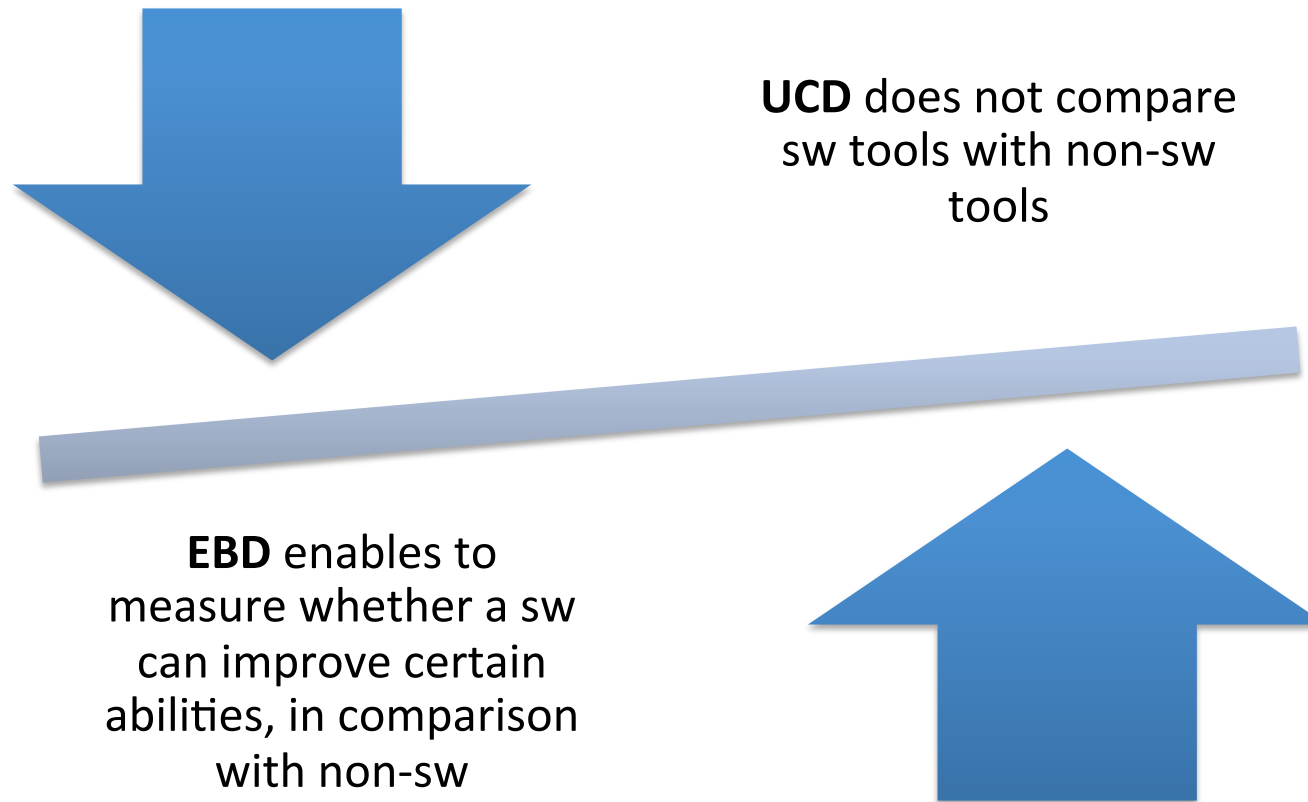
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# Conclusions and Future (1/3)



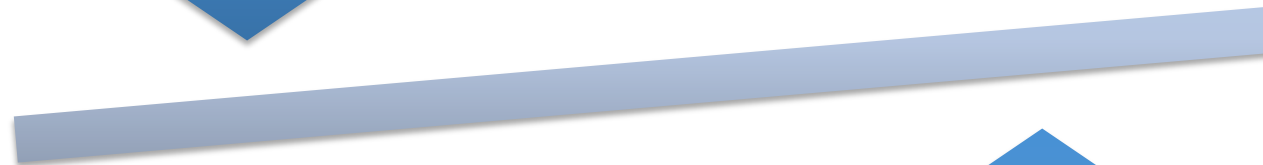
# Conclusions and Future (2/3)



# Conclusions and Future (3/3)

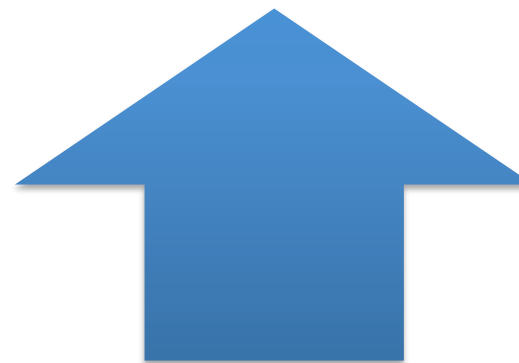


**EBD** experts may represent a disadvantage, especially with respect to the cyclic and iterative nature of the UCD process



**UCD** helps reducing the bias concerning the introduction of a sw tool, since the tool is designed to be usable

**UCD** is flexible, it is easy to fit usability methods into the stricter EBD protocols





# EB-TEL'13



- ▶ The 2<sup>nd</sup> **evidence-based TEL** workshop (ebTEL'13)

[ebtel.usal.es](http://ebtel.usal.es)

in parallel with PAAMS'13, brings together TEL and evidence-based design.

- ▶ **Venue:** Salamanca (Spain)

- ▶ Important **dates:**

- ▶ Deadline for papers: November 26<sup>th</sup>, 2013

- ▶ Workshop: May 22<sup>nd</sup>-24<sup>th</sup>, 2013

- ▶ Publisher: **Springer**







LEARNER:

THANK

PASSWORD:

YOU

LOGIN