



TERENCE

The TERENCE Project

FP7- ICT-257410

@ ISTC- CNR, Rome

<http://www.terenceproject.eu>

R. Gennari
Free U. of Bozen-Bolzano

T. Di Mascio and P. Vittorini
University of L'Aquila



The TERENCE Project



- TERENCE is a 3-year **collaborative** project
- ▶ of the FP7 framework
 - ▶ for Technology Enhanced Learning (**TEL**)
 - ▶ with 12 partners and 2 consultants
 - ▶ for developing an **adaptive learning system**
 - ▶ that adapts, to its users, its learning material
 - ▶ stories and games
 - ▶ and learning tasks
 - ▶ reading and playing
 - ▶ to stimulate their reading comprehension → [demo](#)
 - ▶ The project is thus highly cross-disciplinary **but with common thread**
 - ▶ So is this presentation (we hope :-))





Thread - Outline



STEP I - Introduction: the
TERENCE ideas in a nutshell

STEP II - What: the design of the
learning material and tasks

STEP III - Who: users and
adaptation

STEP IV - How: the evaluation of
the material and adaptation

STEP V - The end: conclusions





STEP I: Introduction



Thread - Outline



STEP I - Introduction: the
TERENCE ideas in a nutshell

STEP II - **What:** the design of the
learning material and tasks

STEP III - **Who:** users and
adaptation

STEP IV - **How:** the evaluation of
the material and adaptation

STEP V - **The end:** conclusions





The TERENCE Ideas in a Nutshell



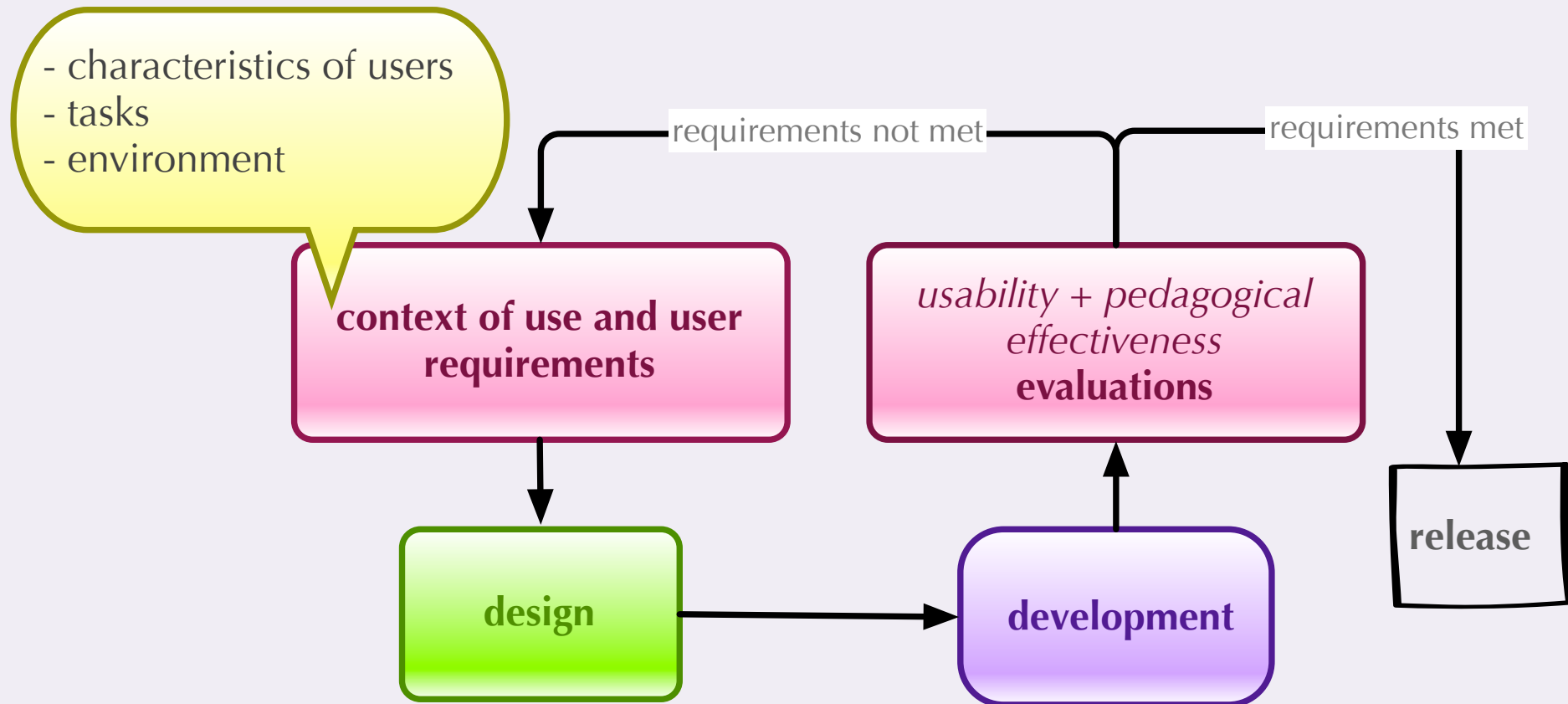
- Given that
 - the **goal** of TERENCE is stimulating reading comprehension (RC)
 - by means of an **adaptive learning system** that adapts its
 - adequate learning **material** and effective learning **tasks**
 - to its **learners** that are poor comprehenders, hearing and deaf, 7-11 year old, in Italy and UK
- then
 - the **design** of TERENCE is user centred and evidence based



TERENCE: UCD + EBD



- ✓ UCD is from interaction design and EBD is from evidence based medicine





Early Stage



GOLDEN BULLETS

adequate material

effective tasks

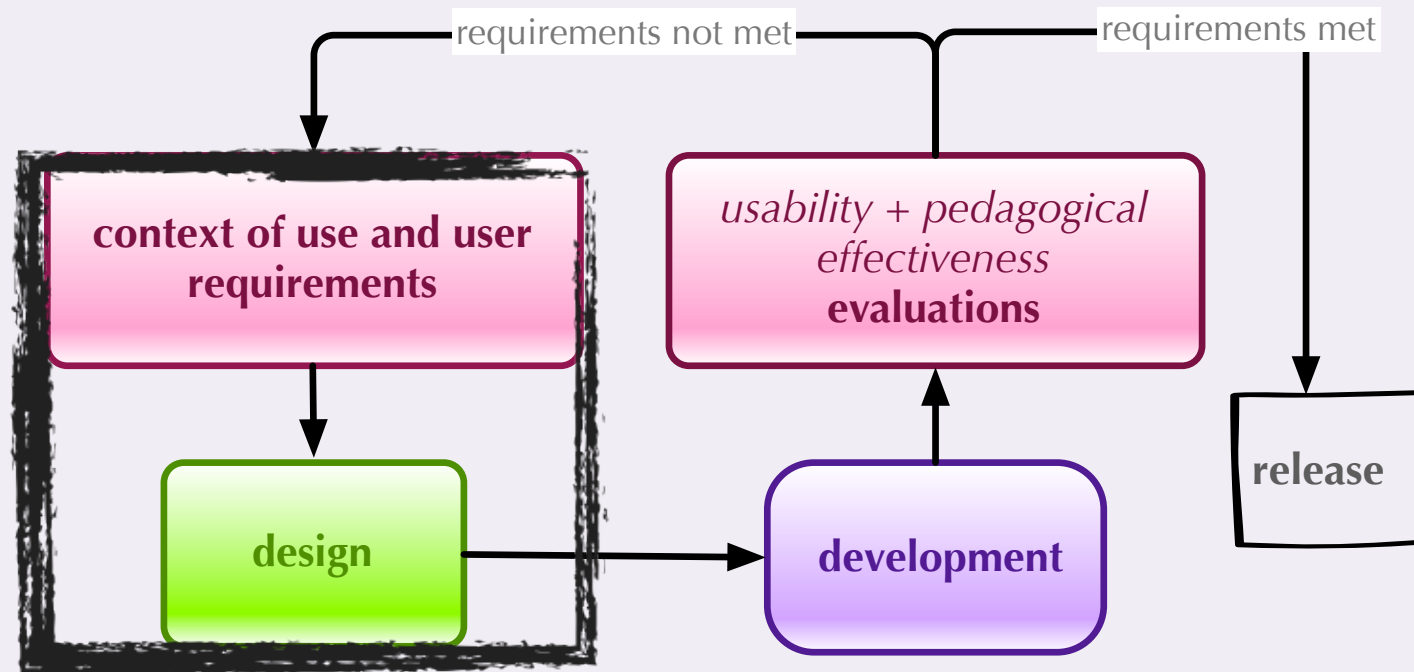
system adapts the material and tasks to the appropriate learners

HOW WE GET IT WITH UCD+EBD

by involving of all users in its design

by letting stimulation plan experts frame the tasks within a stimulation plan

by analysing the characteristics of learners





Latest Stage



GOLDEN BULLETS

HOW WE GET IT WITH UCD+EBD

adequate material

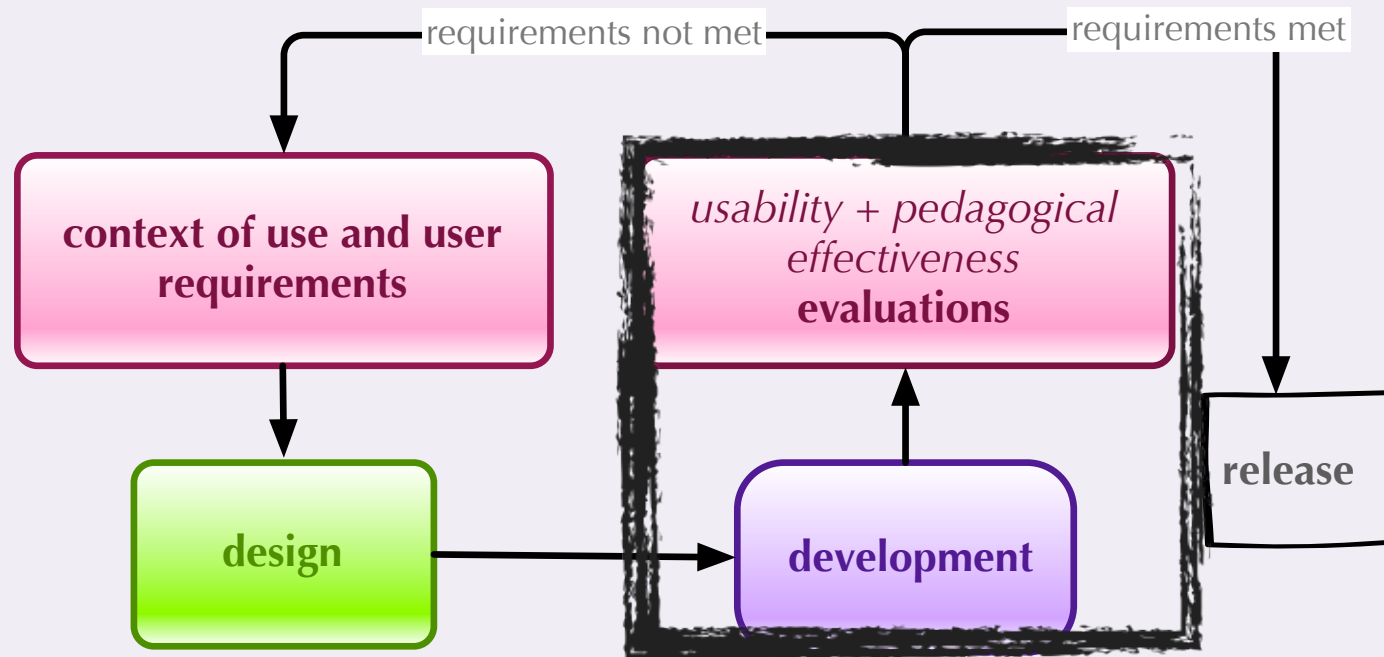
by evaluating the material with users

effective tasks

by evaluating the pedagogical effectiveness of the system with users

system adapts the material and tasks to the appropriate learners

by evaluating the usability of the system with users





STEP II: What



Thread - Outline



STEP I - Introduction: the TERENCE ideas in a nutshell

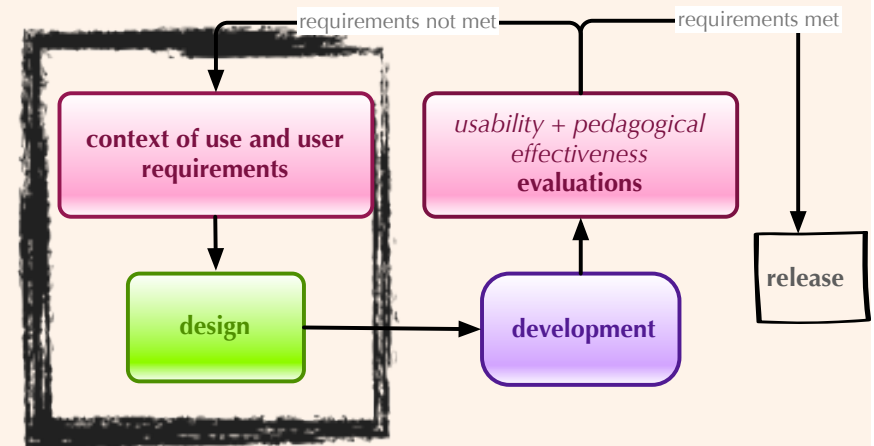
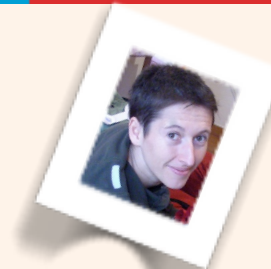
STEP II - **What**: the design of the learning material and tasks

- the data for the learning material
- the design of material and tasks

STEP III - **Who**: users and adaptation

STEP IV - **How**: the evaluation of the material and adaptation

STEP V - **The end**: conclusions





Thread - Outline



STEP I - Introduction: the TERENCE ideas in a nutshell

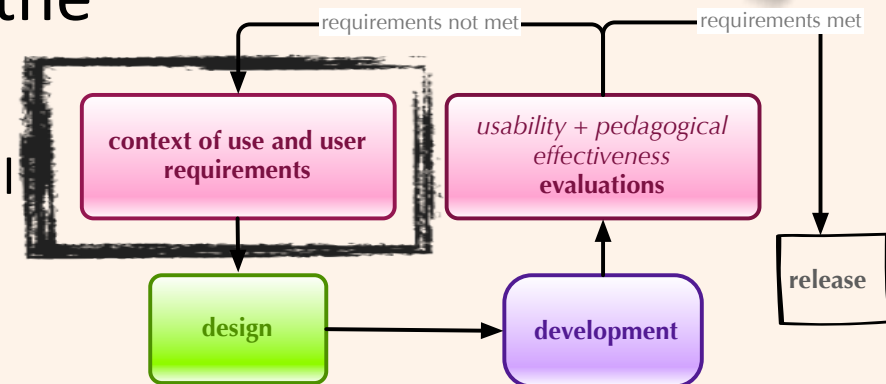
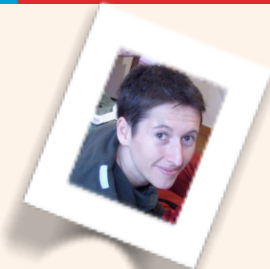
STEP II - **What**: the design of the learning material and tasks

- a. the data for the learning material
- b. the design of material and tasks

STEP III - **Who**: users and adaptation

STEP IV - **How**: the evaluation of the material and adaptation

STEP V - **The end**: conclusions





The UCD Data



- **Data**: the main data for the learning material (stories and games) and tasks (reading and playing) are from
 - **contextual inquiries** with
 - diagnosis experts from IT and UK
 - and with stimulation plan experts from IT and USA
 - UCD **field studies** with educators
- **Participants (EDUCATORS)** in the field studies
 - 30 in Italy and 15 in UK
- One of the main **goals**:
 - requirements concerning the design of the learning material (stories and games) and tasks (reading and playing)



Cont. Inquiry Example Material



1. Diagnosis experts:

- purely textual inference-making question-answering
- or with the aid of pictures



Segna con una crocetta l'elemento intruso.

2. Stimulation and pedagogy experts:

- paper-and-pencil puzzle-like games
- rewards





Cont. Inquiry Example Material



1. Diagnosis experts:

- purely textual inference-making question-answering
- or with the aid of pictures

2. **Stimulation** and pedagogy experts:

- paper-and-pencil puzzle-like games
- rewards

Il mulino era proprio vecchio e malandato; al suo interno alcuni topolini avevano costruito il loro nascondiglio. Dentro il nascondiglio c'era un grande baule, dentro il baule c'era una valigia, dentro la valigia una scatola, dentro la scatola un portafoglio, dentro il portafoglio un biglietto, dentro il biglietto c'era scritto:

*"TOPOLINI ATTENZIONE
IL GATTO POTREBBE
MANGIARVI A COLAZIONE!"*

*cosa c'è dentro il nascondiglio?
il baule è dentro:
(a) il mulino (b) la valigia...*

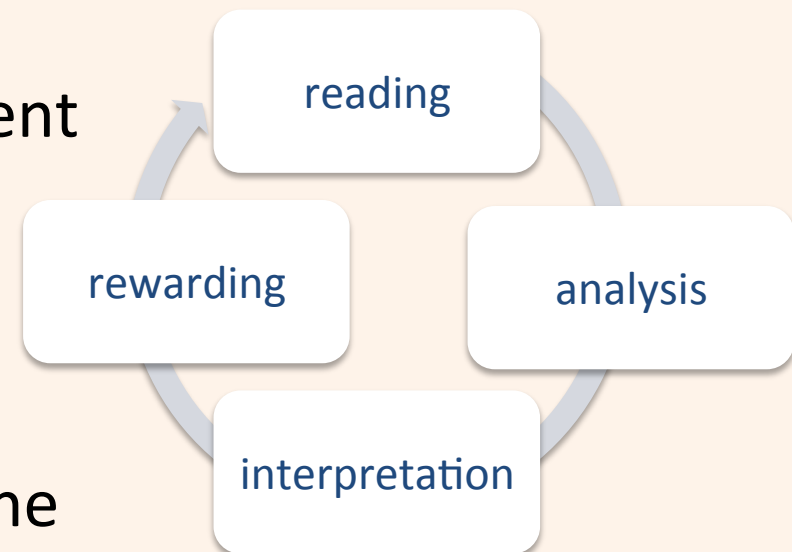


Example Task from Field Study



Diverse interventions by **educators**:

1. **reading** stories **together** in class, paraphrasing
2. **analysing** stories in class by breaking them into their “salient moments”
3. **interpreting** the story in class by means of
 - drama exercises to stimulate the learners' empathy with the story
 - drawing
4. specific **rewards** in particular with deaf learners



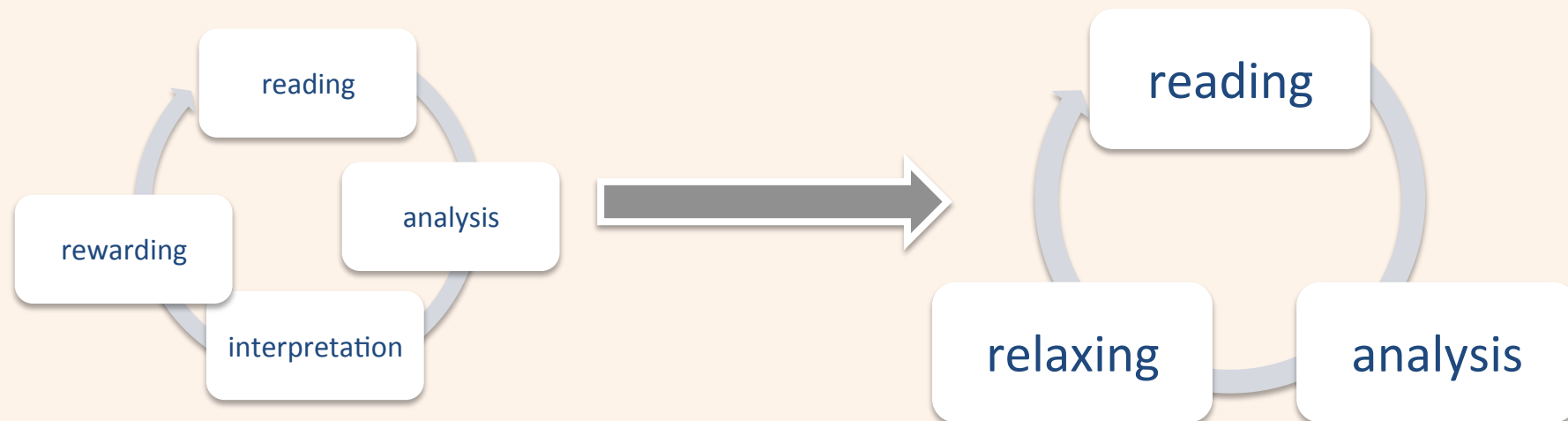


Stimulation Plan (1/2)



Revision and classification of tasks **effective for stimulation** with **experts of stimulation** (D. di Giacomo):

1. reading stories
2. playing with effective **analysis interventions**
3. playing with relaxing games for relaxing, rewarding and motivating



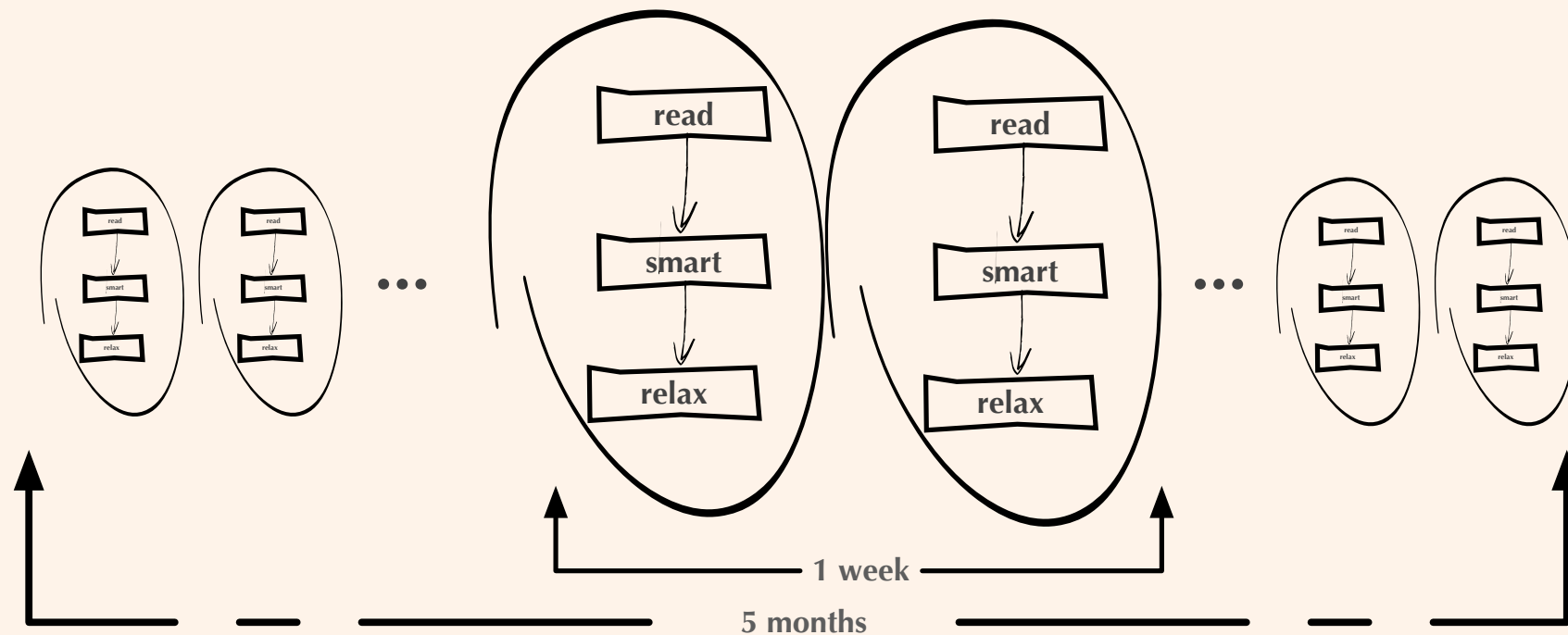


Stimulation Tasks (2/2)



Such tasks are scheduled by **experts** in sessions, where

- each **session** consists of: (1) reading; (2) playing with smart games; (3) playing with relaxing games
- there are 2 sessions a week for 5 months





Thread - Outline



STEP I - Introduction: the TERENCE ideas in a nutshell

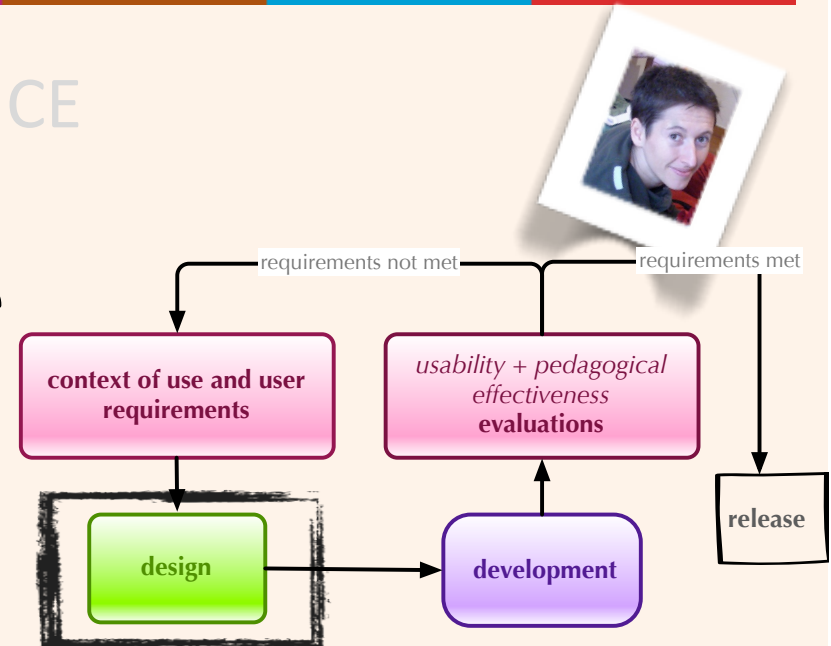
STEP II - **What**: the design of the learning material and tasks

- the data for the learning material
- the design of material and tasks

STEP III - **Who**: users and adaptation

STEP IV - **How**: the evaluation of the material and adaptation

STEP V - **The end**: conclusions





Usage for Stories and Games



- The requirements for the learning material and tasks were used to
 - design the books of stories
 - design stories in levels for the TERENCE learners
 - design relaxing and smart games for a story level, e.g.,
 - *the levels of game
 - *the game rules and framework
 - design the annotation and extraction of relevant information in stories for generating smart games



Usage for Stories and Games



- The requirements for the learning material and tasks were used to
 - design the books of stories
 - design stories in levels for the TERENCE learners
 - design relaxing and smart games for a story level, e.g.,
 - *the levels of game
 - *the game rules and framework
 - design the annotation and extraction of relevant information in stories for generating smart games



Design of Stories



Structure: in general, a good story should have

- a setting,
- an initiating event,
- an internal response,
- an attempt,
- a consequence and a reaction or final solution.

Plot: stories and characters should be appealing to **nowadays'** young readers: narrative should be greater than descriptive content, with a focus on protagonists' goals, actions and reactions

Characters: animate characters (persons, robots, ghosts, animals etc.) are preferred for children **aged 7-11**

Length: prefer short stories or stories segmented into short episodes for the **TERENCE learners**

Levels: stories are divided into 4 levels of varying text complexity and coherence (see next slide) for the **TERENCE learners**



Levels of Stories (UniPD, UoS)



Learner Level	Acquired skills		
	Global Coherence	Local Cohesion	Lexicon/syntax
Level 1	Poor	Poor	Poor
Level 2	Poor	Poor	Good
Level 3	Poor	Good	Good
Level 4	Good	Good	Good



Usage for Stories and Games



- The requirements for the learning material and tasks were used to
 - design the books of stories
 - design stories in levels for the TERENCE learners
 - design relaxing and smart games for a story level, e.g.,
 - *the levels of game
 - *the game rules and framework
 - design the annotation and extraction of relevant information in stories for generating smart games



Usage for Stories and Games



- The requirements for the learning material and tasks were used to
 - design the books of stories
 - design stories in levels for the TERENCE learners
 - design relaxing and smart games for a story level, e.g.,
 - *the levels of game
 - *the game rules and framework
 - design the annotation and extraction of relevant information in stories for generating smart games

Design of rules depends on the stimulation plan and its organisation constraints, e.g., on **time**:

Learner actions	States of the system	Constraints
no solution	interaction feedback	time for interaction f.
	solution feedback	time for solution f.
correct solution	“yes”-consistency feedback	
wrong solution	“no”-consistency feedback	
	explanatory feedback	



Consistency and Explanatory Feedback



SMART GAMES

2 GAME POINTS 0 TOTAL

Before While

NO!

Anabel tells Sophie and Ben her name

Sophie sits in the back row on the bus

The cars are stuck on the road

QUESTION: What happens before? What happens during?

SKIP >

consistency feedback

explanatory feedback



Game Framework



Instructions	Questions	Motivational	Interaction	
Choices	Availability is state dependent			
Solutions	Choices or their combinations that are correct/wrong (c/w) solutions			
Feedback	Interaction	Consistency (c/w)	Explanatory	Solution
Smart points	Proportional to the learner's ability in the game level			
Relaxing points	Constant			
Avatar	Happy/sad states			
Time	solution constant		interaction constant	
Rules	States of the system, actions of the learner, constraints			



Game Framework



Instructions

Choices

Solutions

Feedback

Smart points

Relaxing points

Avatar

Time

Rules



Game Framework



Instructions	What happens before?...	Help your avatar...	Drag and...
Choices	3 choices: all are illustrated events of the story with textual labels		
Solutions	a correct solution is a tuple so that...		
Feedback	Interaction	Consistency (c/w)	Explanatory for tuple... Solution
Smart points	Proportional to the learner's ability in the game level		
Relaxing points	none		
Avatar	Happy/sad states		
Times	interaction: 10 seconds	solution: 1 minute	
Rules	two solutions and the game is over...		

Before
-
After

"TRAFFIC JAM"

INSTRUCTIONS

WHAT HAPPENS BEFORE? WHAT HAPPENS AFTER?
Your avatar needs help. Drag and Drop the correct
image. Careful: two mistakes and you lose!

2 POINTS



Before



Anabel tells Sophie and
Ben her name

After



Sophie sits in the back
row on the bus



The cars are stuck
on the road



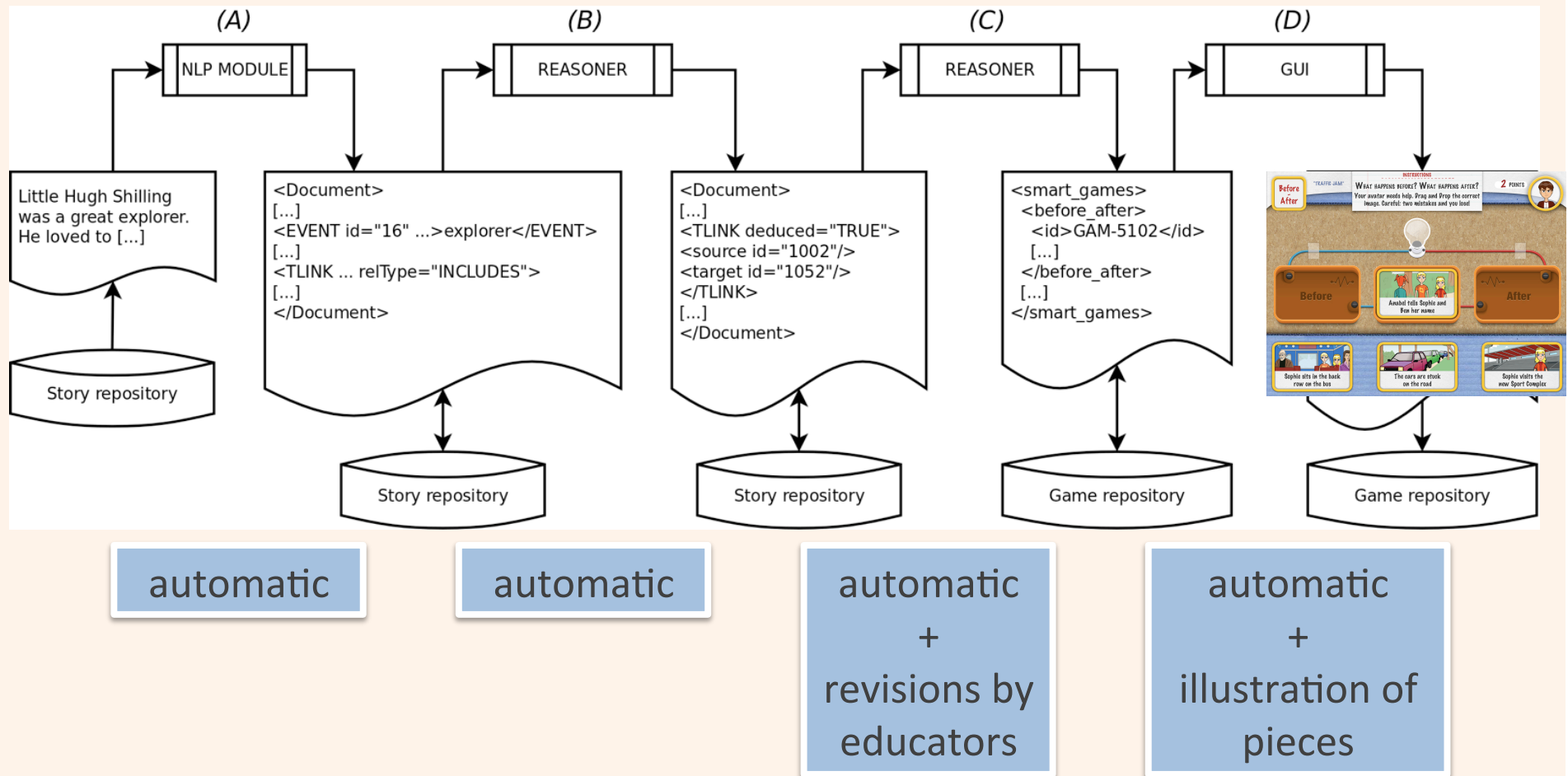
Sophie visits the
new Sport Complex



Usage for Stories and Games



- The requirements for the learning material and tasks were used to
 - design the books of stories
 - design stories in levels for the TERENCE learners
 - design relaxing and smart games for a story level, e.g.,
 - *the levels of game
 - *the game rules and framework
 - design the annotation and extraction of relevant information in stories for generating smart games





Brainstorming



- Suggestions for **stories**?
- Suggestions for **games**, e.g., adding games concerning whether
 - a character in a story/event has certain
 - goals
 - emotions
 - behaviours
 - good/bad relations with other characters (D1.1, D1.4)?
- Other suggestions?



STEP III: Who



Thread - Outline



STEP I - Introduction: the
TERENCE ideas in a nutshell

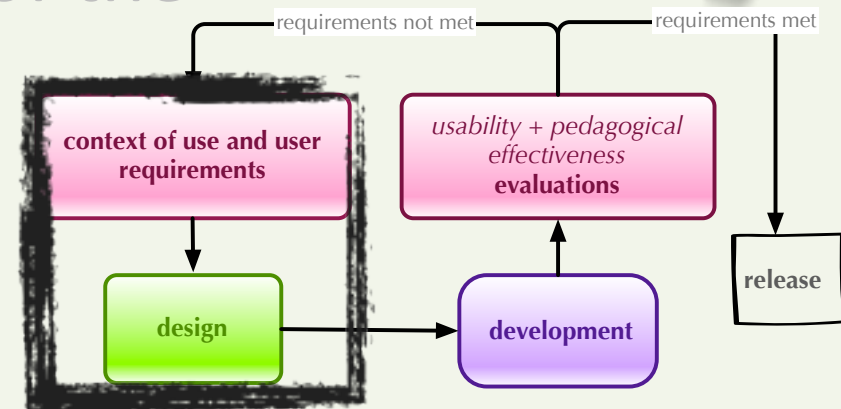
STEP II - What: the design of the
learning material and tasks

STEP III - Who: users and
adaptation

- the data about users
- the design of the adaptation to users

STEP IV - How: the evaluation of
the material and adaptation

STEP V - The end: conclusions





Thread - Outline



STEP I - Introduction: the TERENCE ideas in a nutshell

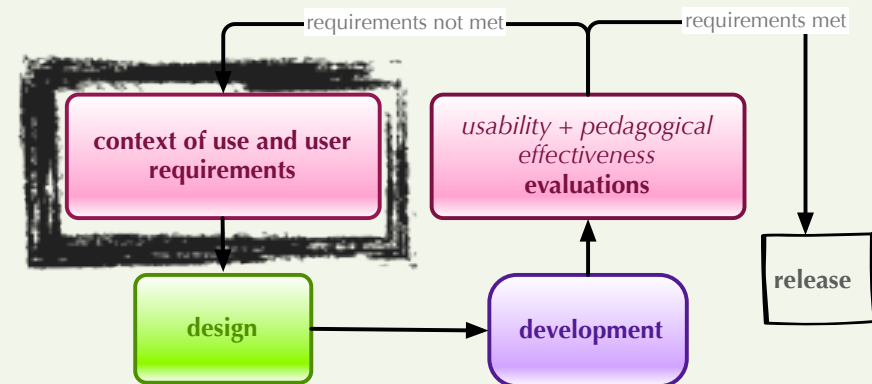
STEP II - What: the design of the learning material and tasks

STEP III - Who: users and adaptation

- the data about users
- the design of the adaptation to users

STEP IV - How: the evaluation of the material and adaptation

STEP V - The end: conclusions





Who are TERENCE Users?



- **Learners**, 7-11 year old children, hearing and deaf, with text comprehension problems but no decoding problems
- **Educators**
 - teachers
 - parents
- **Experts**
 - educational psychologists
 - logicians
 - linguists



Reading Comprehension Levels



Data: the main data for defining reading comprehension (RC) levels and interaction are from

- 1) brainstorming meetings and inquiries with diagnosis experts
- 2) literature studies of psychologists and interaction papers
- 3) field studies
 - **participants:** in the field studies
 - 282 learners in Italy and
 - 226 learners in UK

Goals: requirements concerning RC and interaction for the adaptation



RC Levels



	Top	Low
R C	Global coherence	Inference-making (global) Integration (global)
	S K I L L S	Local cohesion
Lexical skills		...

Source: brainstorming and inquiries

Report: D1.1 , revised in D2.2 - **RC levels**



Results for Interaction in IT



Acronym	Explanation	Personas
DF	Deaf Female	Carla
HF	Hearing female	Maria
HRMN Low Age	Hearing Rural Male coming from North Italy low aged	Giulio
HUMN Low Age	Hearing Urban Male coming from North Italy low aged	Enrico
HUMN High Age	Hearing Urban Male coming from North Italy high aged	Angelo

Source: field studies and literature studies

Report: D1.2a – **interaction characterization of IT learners**



Results for Interaction in UK



Acronym	Explanation	Personas
HM Low Age	Hearing Male low aged	Ryan
HF High Age	Hearing Female high aged	Ellie
DM High Age	Deaf Male coming high aged	Jack
HF Low Age	Hearing Female low aged	<u>Caroline</u>

Source: field studies and literature studies

Report: D1.2a – **interaction characterization of UK learners**



Data Gathering Activity for Interaction



Console Activity

Goal: to learn about their favorite 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





Data Gathering Activity for Interaction



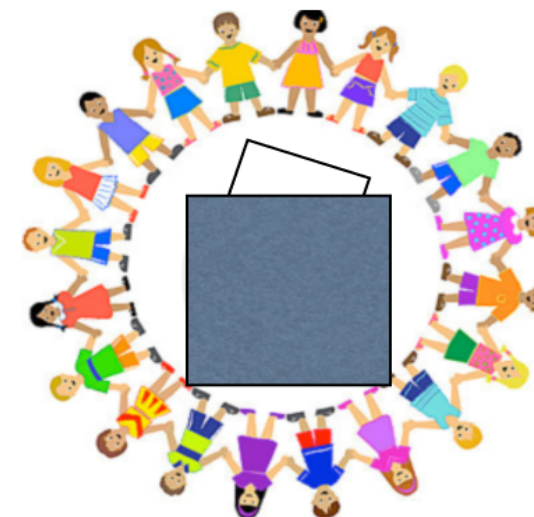
Character Activity

Goal: to learn about their favorite 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





Data Gathering Activity for Interaction

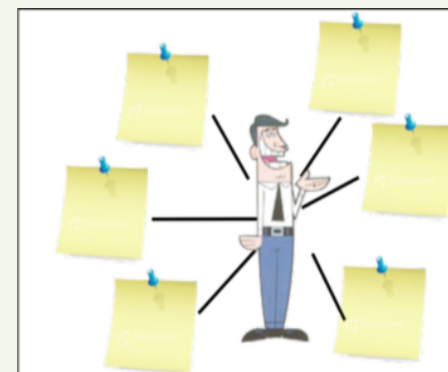


Interaction with Parents Activity

Goal: to learn about what they do with their parents

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

Material: post-it





Data Analysis for Interaction



- Data **management**: data were stored in a data base (open office)
- **Statistic analysis** (STATA):
 - natural variables like gender and age were defined
 - other dichotomy variables were derived
- Data **analysis**:
 - associations of variables for a first classification (e.g., North/Centre)
 - then a refinement of it according to the relevance of the classes for the ALS



Thread - Outline



STEP I - Introduction: the TERENCE ideas in a nutshell

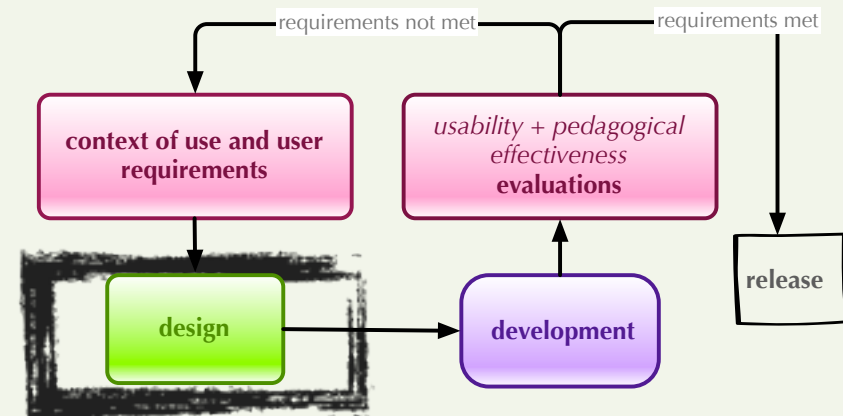
STEP II - What: the design of the learning material and tasks

STEP III - Who: users and adaptation

- the data about users
- the design of the adaptation to users

STEP IV - How: the evaluation of the material and adaptation

STEP V - The end: conclusions





Persona Characteristics for Adaptation



Relevant bio information	
Age range	younger, older
Gender	male, female
Reading comprehension	4 levels
Deafness	with/without cochlear implants,...
Area	urban, rural



Usage of RC levels for Story Levels



Story level	Required skills			Matching learner Level
	Global Coherence	Local Cohesion	Lexicon/syntax	
Level 1	poor	poor	poor	Level 1
Level 2	Poor	Poor	Good	Level 2
Level 3	Poor	Good	Good	Level 3
Level 4	Good	Good	Good	Level 4

Report: [D2.2](#) – matching of story levels and RC levels



Usage of RC Levels



- Story levels are matched with games of diverse levels so that
- entry-level games (e.g., what) are not for level-4 stories
 - top-level games (e.g., cause-effect) are not for level-1 stories
 - the language is more complex for games for higher level stories

Story level	Character		Time				Causality		
	who	what	before-after	before-while	while-after	before-while-after	effect	cause	cause-effect
Level 4			X	X	X	X	X	X	X
Level 3	X	X	X	X	X	X	X	X	X
Level 2	X	X	X	X	X	X	X	X	X
Level 1	X	X	X	X	X	X	X		

Report: [D2.3](#) – matching of story levels and game levels



Persona Characteristics for Adaptation



Relevant bio information	
Age range	younger, older
Gender	male, female
Reading comprehension	4 levels
Deafness	with/without cochlear implants,...
Area	urban, rural



Avatar: age, gender and area affect the type of preferred avatar:

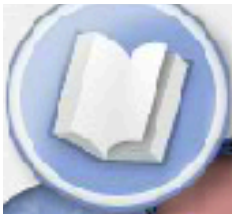
- all, independently of their age, prefer **human-like** avatars to fantasy or animal avatars
 - ▶ to all, present first human-like avatars
- female learners definitely prefer **fantasy** avatars to animal avatars
 - ▶ if female learner then present fantasy animals before animal avatars
- older children prefer photorealistic avatars, contrary to younger children
 - ▶ if older then present photorealistic avatars as first, else vice-versa

CHOOSE YOUR AVATAR



NEXT ►

CHOOSE YOUR BOOK



NEXT ▶

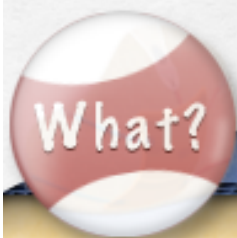


Persona Characteristics for Adaptation



Relevant personality traits

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



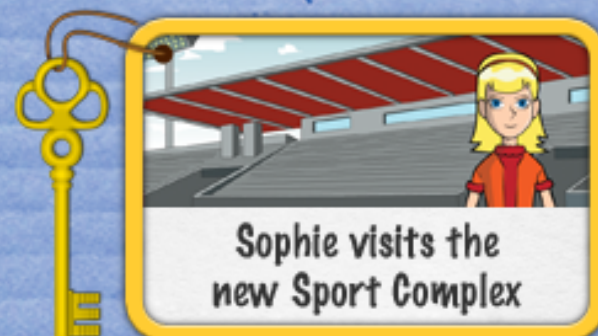
"TRAFFIC JAM"

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





"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



Sophie visits the new Sport Complex



Brainstorming



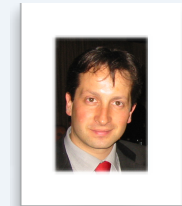
- Educators
- Experts
- New characteristics of learners?
- Suggestions?



Step IV: How



Thread - Outline



STEP I - Introduction: the TERENCE ideas in a nutshell

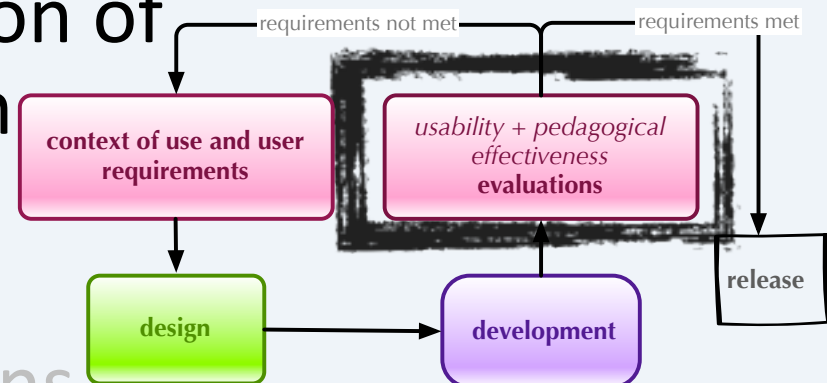
STEP II - What: the design of the learning material and tasks

STEP III - Who: users and adaptation

STEP IV - How: the evaluation of the material and adaptation

- expert based evaluation
- user based evaluation

STEP V - The end: conclusions





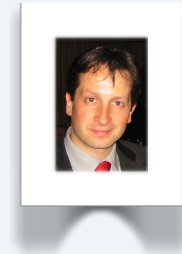
Expert vs User based Evaluation



Method	Advantages	Disadvantages
User-based	<ul style="list-style-type: none">- Most realistic estimate of usability- Can give clear record of relevant problems	<ul style="list-style-type: none">- Time consuming- Costly for large sample of users- Requires high-fidelity prototype
Expert-based	<ul style="list-style-type: none">- Cheap- Fast	<ul style="list-style-type: none">- Expert-variability affects outcome- May overestimate true number of problems



Thread - Outline



STEP I - Introduction: the TERENCE ideas in a nutshell

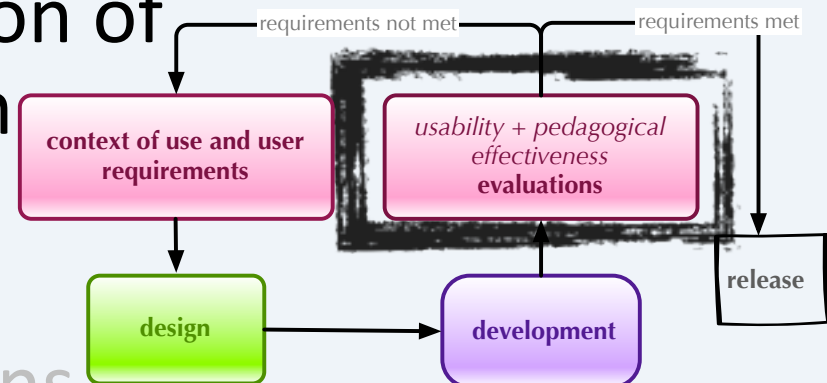
STEP II - What: the design of the learning material and tasks

STEP III - Who: users and adaptation

STEP IV - How: the evaluation of the material and adaptation

- expert based evaluation
- user based evaluation

STEP V - The end: conclusions





Evaluations



	Expert-based	User-based	
		Small-scale	Large-scale
Learning material	X	X	X
Software usability	X	X	X
Effectiveness			X
	Jun 12, Dec 12	Sep 12	Jun 13

- Expert-based evaluation and small-scale evaluation
 - Main focus on usability so to remove biases for the large-scale evaluation
- Large-scale evaluation
 - Main focus on pedagogical effectiveness



Expert-based evaluation



Learning material:

	N. of items	Intended age range
Textual stories	16	Younger learners, 8-9 year old
	9	Older learners, 9-11 year old
Story illustrations	97	Younger learners, 8-9 year old
	65	Older learners, 9-11 year old
Textual smart games	30	Younger learners, 8-9 year old
	21	Older learners, 9-11 year old



Learning Material



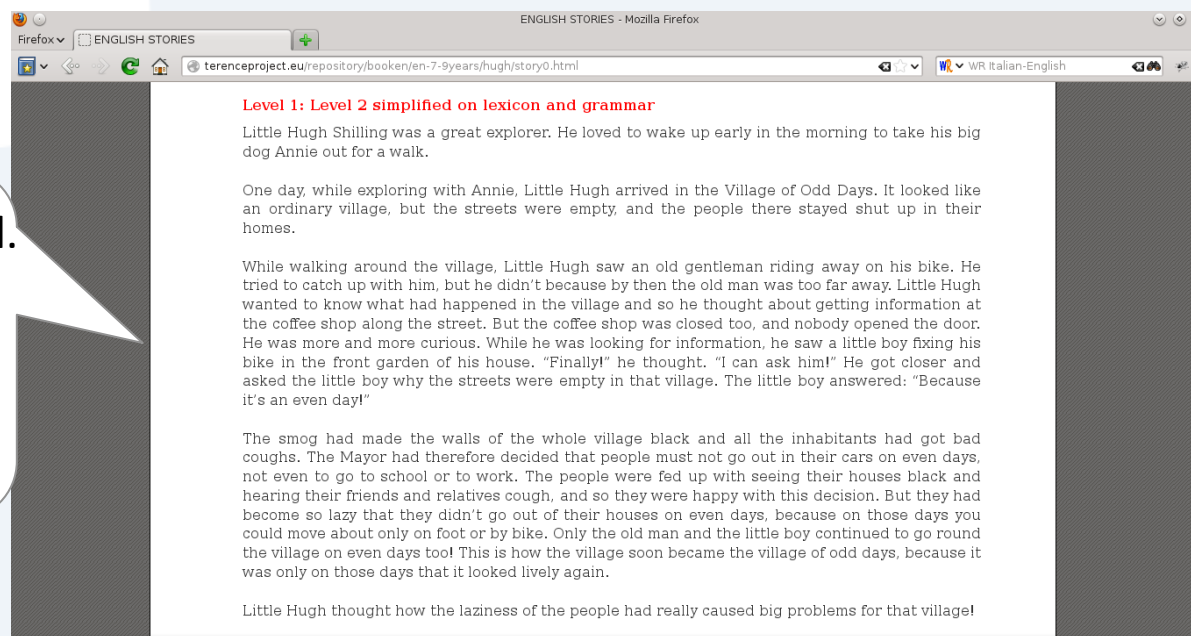
Evaluators:

Material	Evauator	Expertise	Country	Used method
Story levels	M Marshark	Deaf people	US	Heuristic evaluation
	A Marini	Language	Italy	Heuristic evaluation
	S Baldascino	Education	Italy	Heuristic evaluation
	G Danese	Education	Italy	Heuristic evaluation
	R Bove	Education	Italy	Heuristic evaluation
Story illustrations	M Carlini	Design	Italy	Heuristic evaluation
	D Di Giacomo	Semantics	Italy	Expert review
	J Oakhill	Poor compr.	UK	Expert review
Textual smart games	B Arfé	Deaf people	Italy	Expert review
	J Oakhill	Poor compr.	UK	Expert review
	S Sullivan	Deaf people	UK	Expert review

Experts for story levels

- G1.** the story at level N-1 is easier than that the same story at level N,
- G2.** the story at level N-1 is simpler for the considered reading comprehension skill than the same story at level N,
- G3.** the story at level 1 is comprehensible for deaf readers of the intended age range,
- G4.** the story at level 3 is comprehensible for hearing poor comprehenders of the intended age range.

The results are positive in general.
The stories at level 1 were deemed suitable for deaf learners only in 20% of the evaluated cases.



ENGLISH STORIES - Mozilla Firefox

terenceproject.eu/repository/booken/en-7-9years/hugh/story0.html

WR Italian-English

Level 1: Level 2 simplified on lexicon and grammar

Little Hugh Shilling was a great explorer. He loved to wake up early in the morning to take his big dog Annie out for a walk.

One day, while exploring with Annie, Little Hugh arrived in the Village of Odd Days. It looked like an ordinary village, but the streets were empty, and the people there stayed shut up in their homes.

While walking around the village, Little Hugh saw an old gentleman riding away on his bike. He tried to catch up with him, but he didn't because by then the old man was too far away. Little Hugh wanted to know what had happened in the village and so he thought about getting information at the coffee shop along the street. But the coffee shop was closed too, and nobody opened the door. He was more and more curious. While he was looking for information, he saw a little boy fixing his bike in the front garden of his house. "Finally!" he thought. "I can ask him!" He got closer and asked the little boy why the streets were empty in that village. The little boy answered: "Because it's an even day!"

The smog had made the walls of the whole village black and all the inhabitants had got bad coughs. The Mayor had therefore decided that people must not go out in their cars on even days, not even to go to school or to work. The people were fed up with seeing their houses black and hearing their friends and relatives cough, and so they were happy with this decision. But they had become so lazy that they didn't go out of their houses on even days, because on those days you could move about only on foot or by bike. Only the old man and the little boy continued to go round the village on even days too! This is how the village soon became the village of odd days, because it was only on those days that it looked lively again.

Little Hugh thought how the laziness of the people had really caused big problems for that village!

Experts for story illustrations

G1. to assess the coherence between the story text, its illustration and between the illustration choices;

G2. to assess technical aspects of the illustrations.

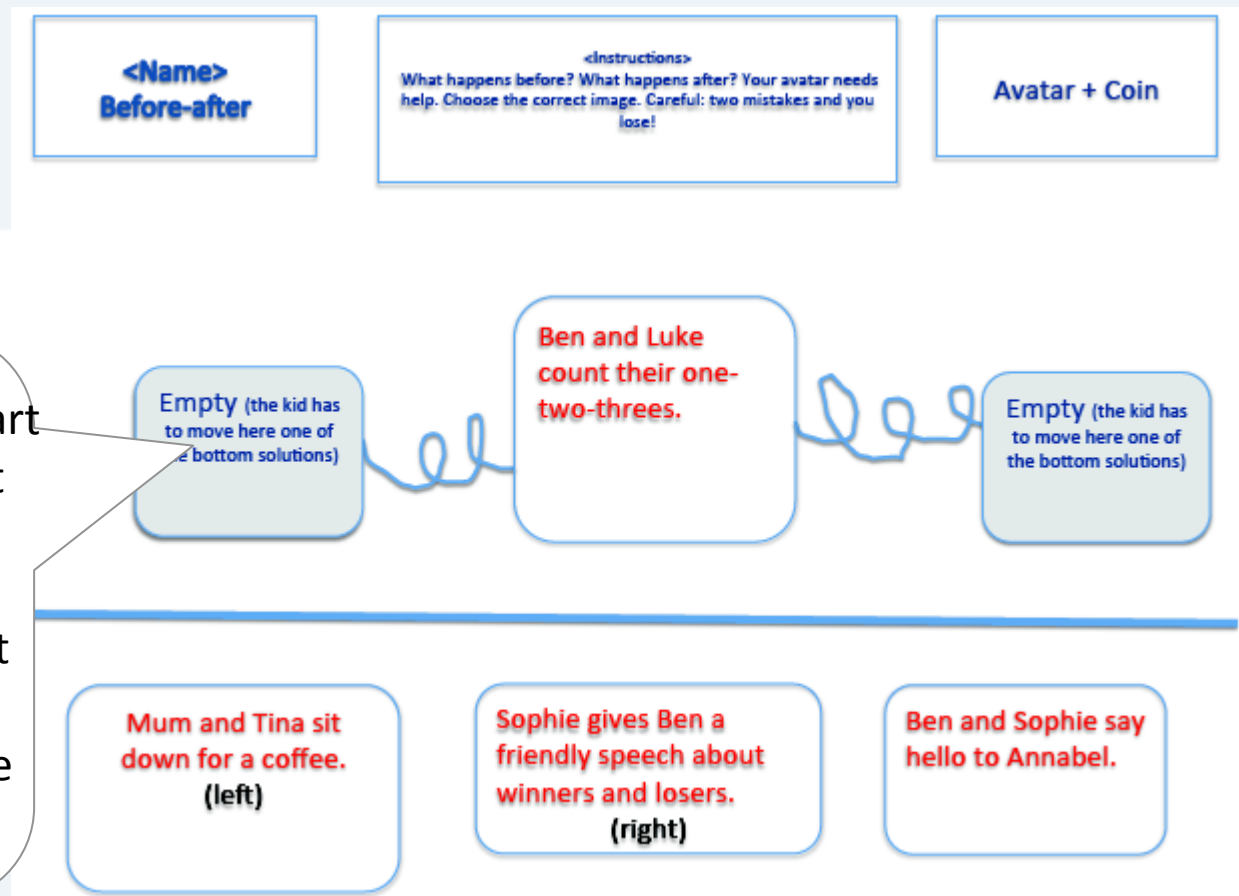
Issues concerning:

- the coherence between the text and the illustration
- the coherence between the illustration choices
- illustrations of books 1 and 2 seem to be richer in details and colors
- sometimes, the illustrations clearly represent or interpret what is in the text; some times it is not



Experts for smart games

G1: assess whether the current textual instances of smart games were adequate for the stimulation plan for the TERENCE learners.



Issues:

- rarely, the events of the smart games are not that relevant in the story;
- some distractors may be too plausible, and hence not sufficiently stimulating
- smart games that stimulate pragmatic inferences could be required



Software Usability



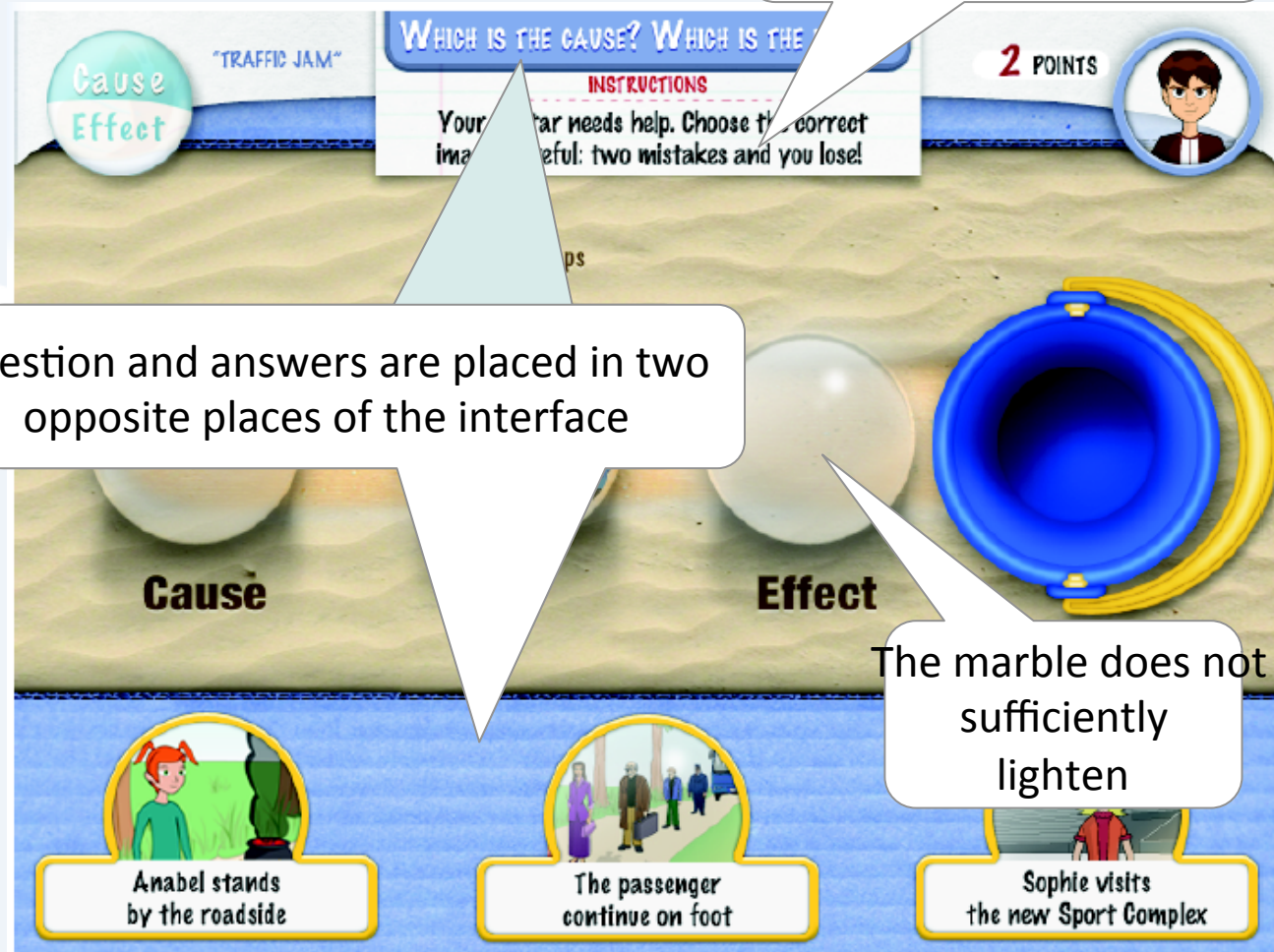
Evaluators

	Evauator	Expertise	Country	Used method
Learner GUI	L Tarantino	Interaction design	Italy	Cognitive walkthrough
Educator GUI	T Di Mascio	Interaction design	Italy	Cognitive walkthrough

Experts for usability:

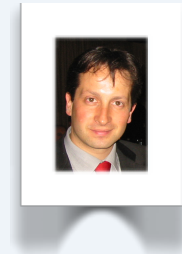
The specific goals were to evaluate whether:

- G1.** the interfaces follow the general visual design guidelines,
- G2.** the interfaces support the user's next step to achieve a task,
- G3.** the interfaces provide the users with appropriate feedback





Thread - Outline



STEP I - Introduction: the TERENCE ideas in a nutshell

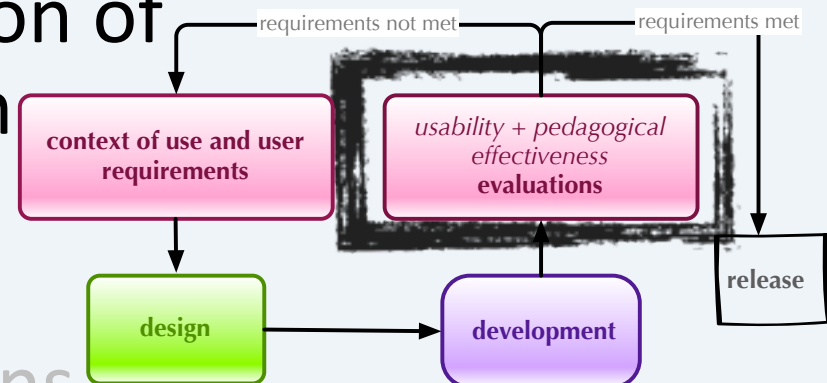
STEP II - What: the design of the learning material and tasks

STEP III - Who: users and adaptation

STEP IV - How: the evaluation of the material and adaptation

- expert based evaluation
- user based evaluation

STEP V - The end: conclusions





Small Scale Evaluation



On going Work

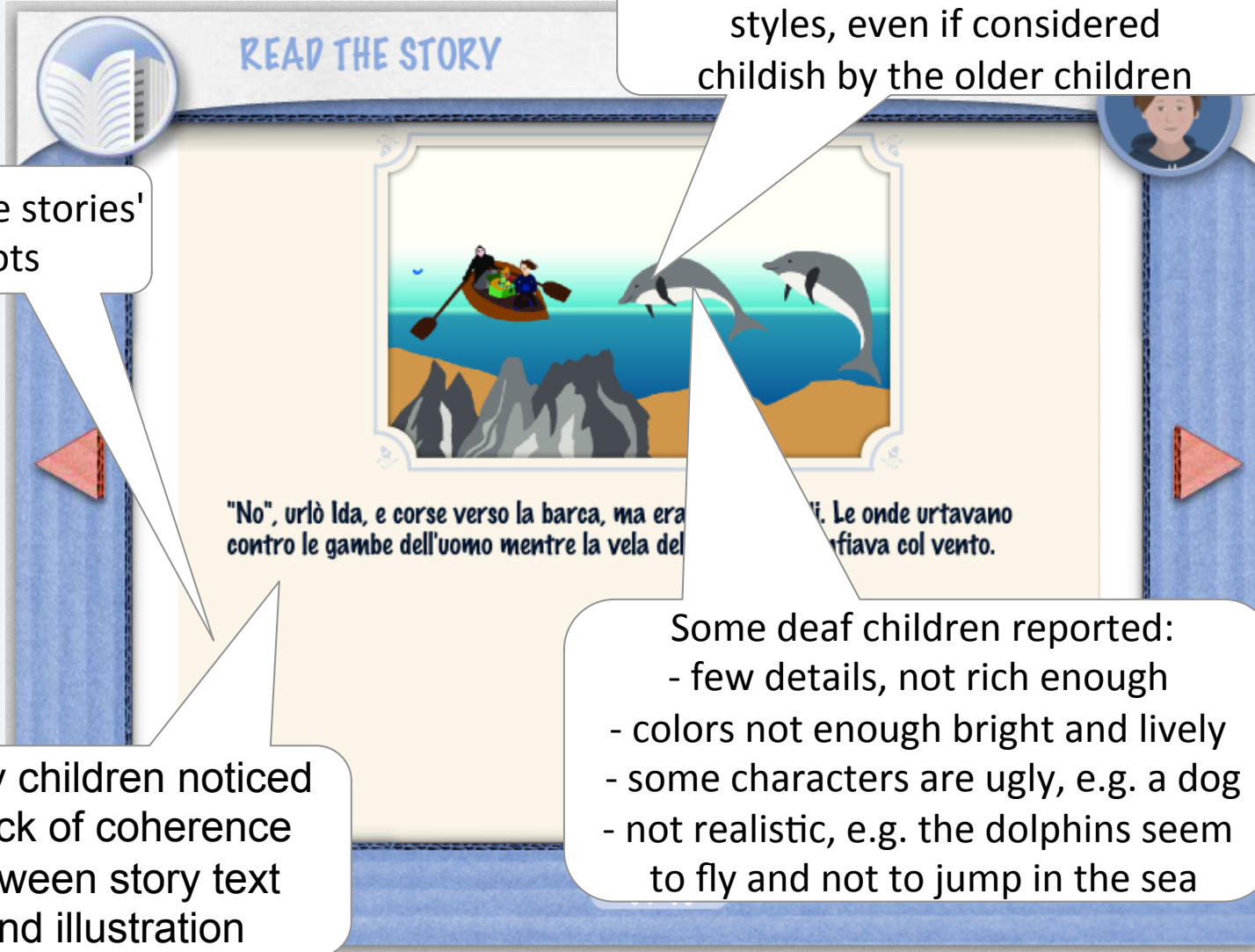
- Experiments completed
 - LNGS, L'Aquila, 11 hearing children, July
 - Rome, 9 deaf children, 5 hearing children, July
 - Avezzano, 5 hearing children, July
 - Avezzano, 11 hearing children, September
 - Bolzano, 6 hearing children, September
 - Treviso, 15 hearing children, September
 - Padova, 4 deaf children, 106 hearing children, July – September
- Total: **159** hearing children, **13** deaf children

Liked the book map concept

The green/gray locks were a bit confusing

Lack of a "back" button





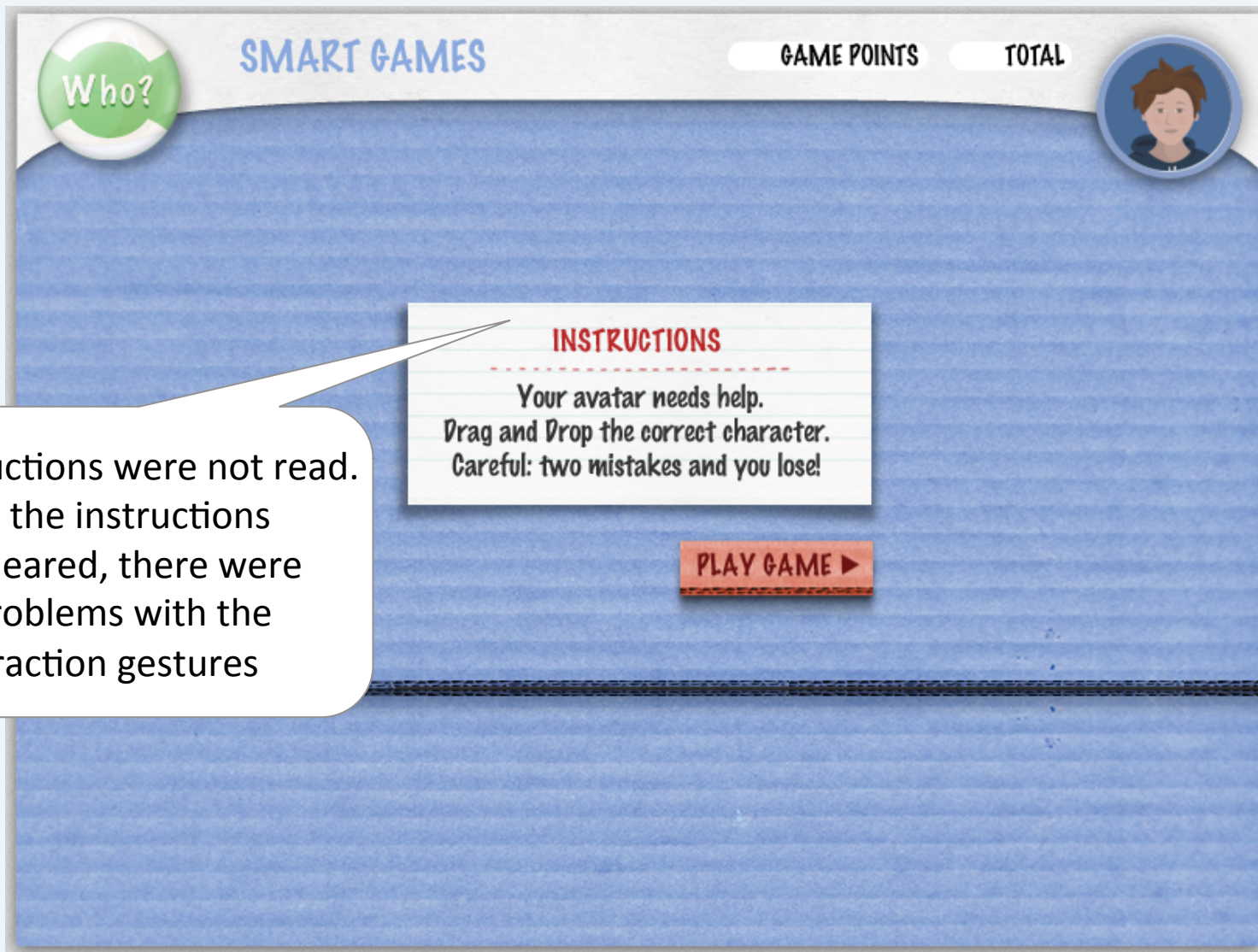
The screenshot shows a digital story interface titled "READ THE STORY". It features a central illustration of a boat on the sea with two people, and two dolphins jumping out of the water. Below the illustration is Italian text: "No", urlò Ida, e corse verso la barca, ma era... contro le gambe dell'uomo mentre la vela del... Le onde urtavano... fiava col vento.

Callout 1 (left): Liked the stories' plots

Callout 2 (top right): Liked the illustration styles, even if considered childish by the older children

Callout 3 (bottom left): Many children noticed a lack of coherence between story text and illustration

Callout 4 (bottom right): Some deaf children reported:
- few details, not rich enough
- colors not enough bright and lively
- some characters are ugly, e.g. a dog
- not realistic, e.g. the dolphins seem to fly and not to jump in the sea



The instructions were not read. Once the instructions were cleared, there were no problems with the interaction gestures



Main Results



All learners liked the smart games

SMART GAMES

2 GAME POINTS 4 TOTAL

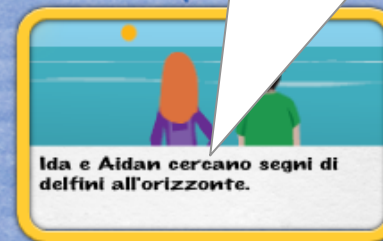
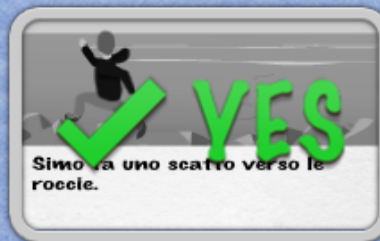
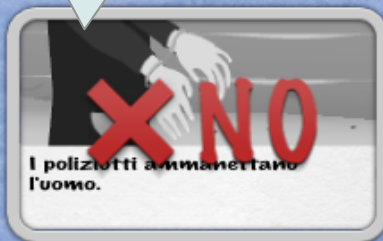


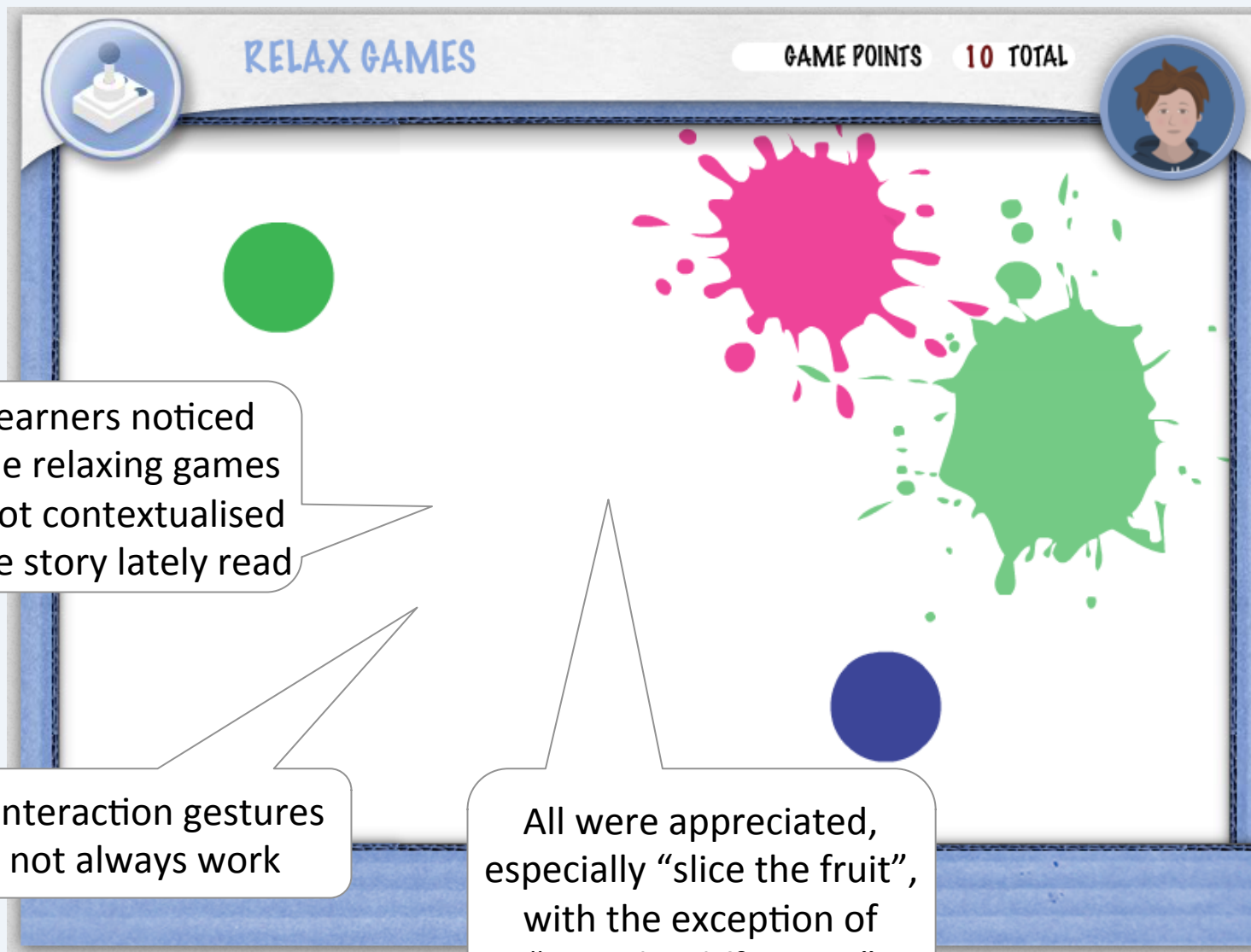
The point cumulated and those gained are not clear, though they were better noticed by the male learners

The yes/no feedback is too prominent wrt the explanatory feedback

Cosa avviene prima? Cosa avviene durante?

Drag-and-drop was considered very enjoyable by all children





The learners noticed that the relaxing games were not contextualised with the story lately read

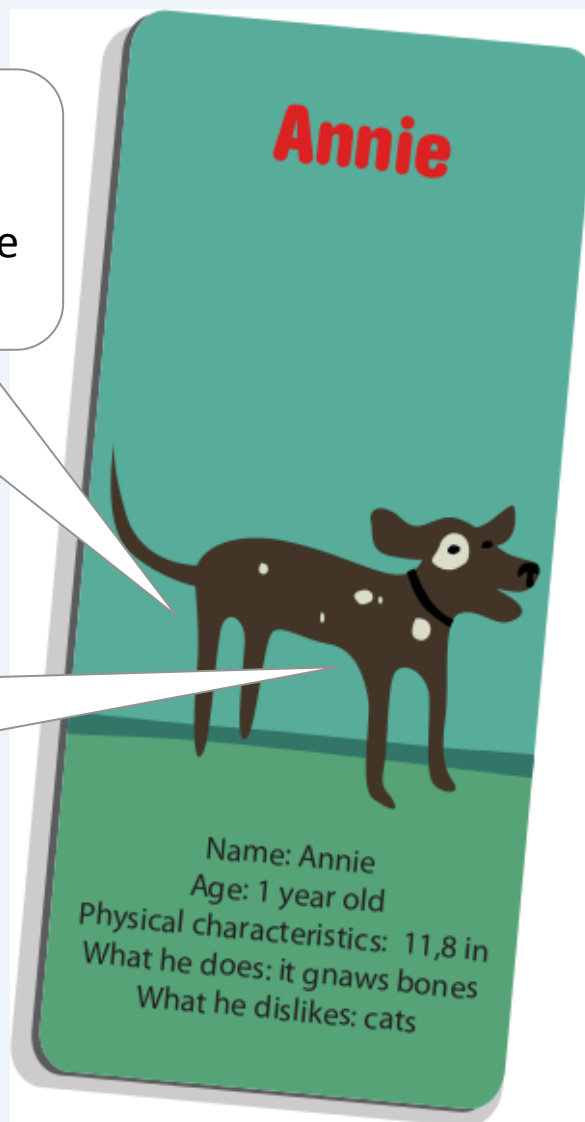
The interaction gestures do not always work

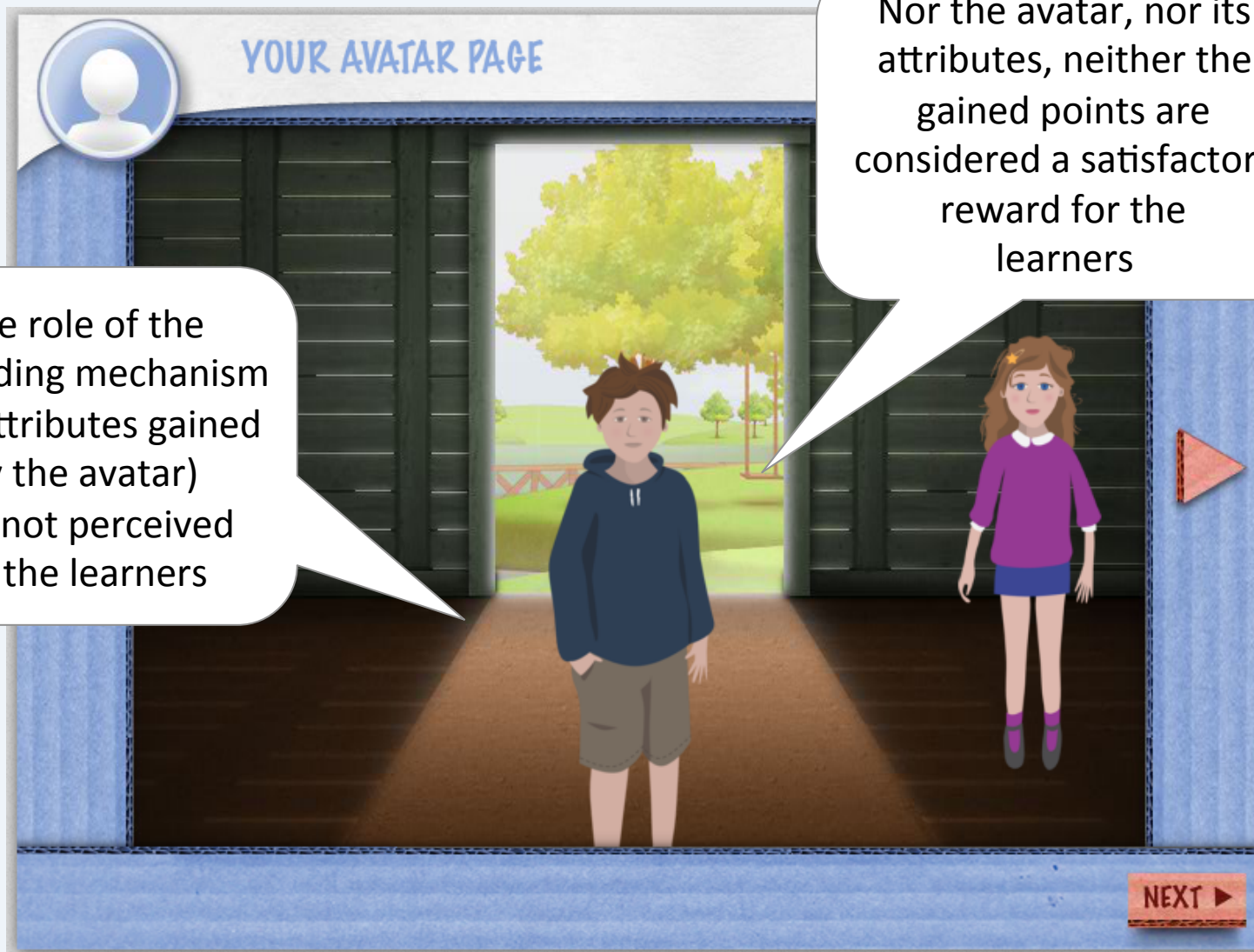
All were appreciated, especially "slice the fruit", with the exception of "spot the difference"

Main Results

Too many cards,
unordered,
sometimes unreadable
or not credible

Children would have
preferred cards per
story, rather than per
book





The role of the rewarding mechanism (i.e. attributes gained by the avatar) was not perceived by the learners

Nor the avatar, nor its attributes, neither the gained points are considered a satisfactory reward for the learners



Main Actions



Next release should be improved in terms of

- navigation
- avatar
 - guide for learners
- illustrations
- story level 1
- smart games
 - explanatory feedback
 - instructions
 - no interruptions in the sequence
 - improved heuristics for generating smart games
 - manual revision
- management of points
- relaxing games
 - their functioning and integration
 - use as a rewarding mechanism



Large Scale Evaluation



The stimulation plan in short

- Five months (Jan-May)
- Two sessions per week
- Each session is organised as follows
 - reading (ca 15 minutes)
 - smart games (ca 15 minutes)
 - relaxing games (ca 15 minutes)
- Pre-post tests (Nov-Dec, May-Jun), and possibly with a control group
 - UniPD in D1.1 suggests MT-tests
 - The psychological unit of UnivAQ suggests further tests, e.g., PPVT-R, “prova di comunicazione referenziale”, coloured progressive matrices, neuropsychological evaluation battery



Brainstorming



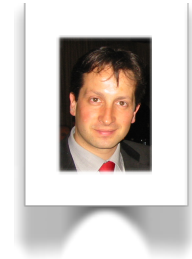
- Suggestions on how to improve
 - the expert-based evaluation
 - it ends in December
 - the large-scale evaluation, e.g.,
 - different tests,
 - different organisation of the stimulation?



Step V: The End



Thread - Outline



STEP I - Introduction: the TERENCE ideas in a nutshell

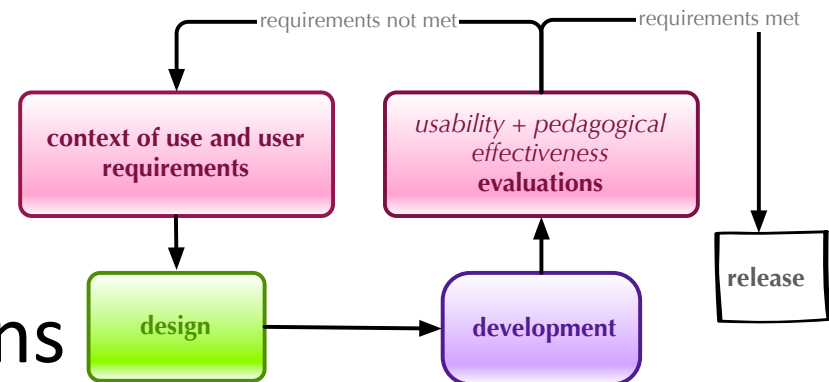
STEP II - What: the design of the learning material and tasks

STEP III - Who: users and adaptation

STEP IV - How: the evaluation of the material and adaptation

- expert based evaluation
- user based evaluation

STEP V - The end: conclusions





The TERENCE Consortium



Partner	Main contribution	Country
UnivAQ	SW design	Italy
LUB	SW design	Italy
LUH	SW design	Germany
KUL	NLP	Belgium
FBK	NLP	Italy
MOME	Graphics	Hungary
USAL	SW development	Spain
AMNIN	SW testing	Slovenia
UniPD	C&E Psychology	Italy
UoS	C&E Psychology	UK
UniVR	C&E Psychology	Italy
SIVECO	Dissemination	Romania

2 Expert Consultants: Marc Marschark (RIT); Paul van den Broek (Leiden U.)



LEARNER:

THANK

PASSWORD:

YOU

LOGIN

1. **Introduction:** the TERENCE idea in a nutshell
2. **What:** the TERENCE learning material
3. **Who:** the users of TERENCE
4. **How:** the evaluation of TERENCE
5. **The end:** conclusions

