

Learning from a Planets Game: Elements of a didactical transposition described with the CPM language

Thierry Nodenot

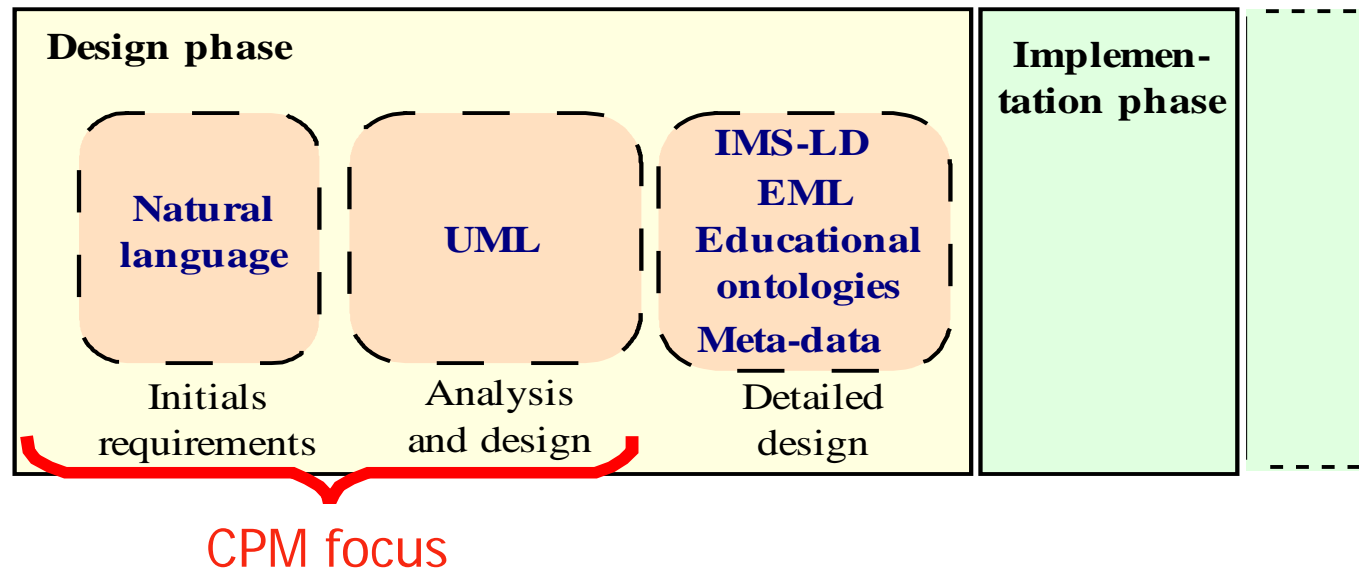
**IUT de Bayonne
Laboratoire LIUPPA - France**

Outline of the talk

- ✓ Aims and general characteristics of the CPM language
 - ✓ Snapshots of the Planets Game specification
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- ✓ Discussion

CPM : General overview

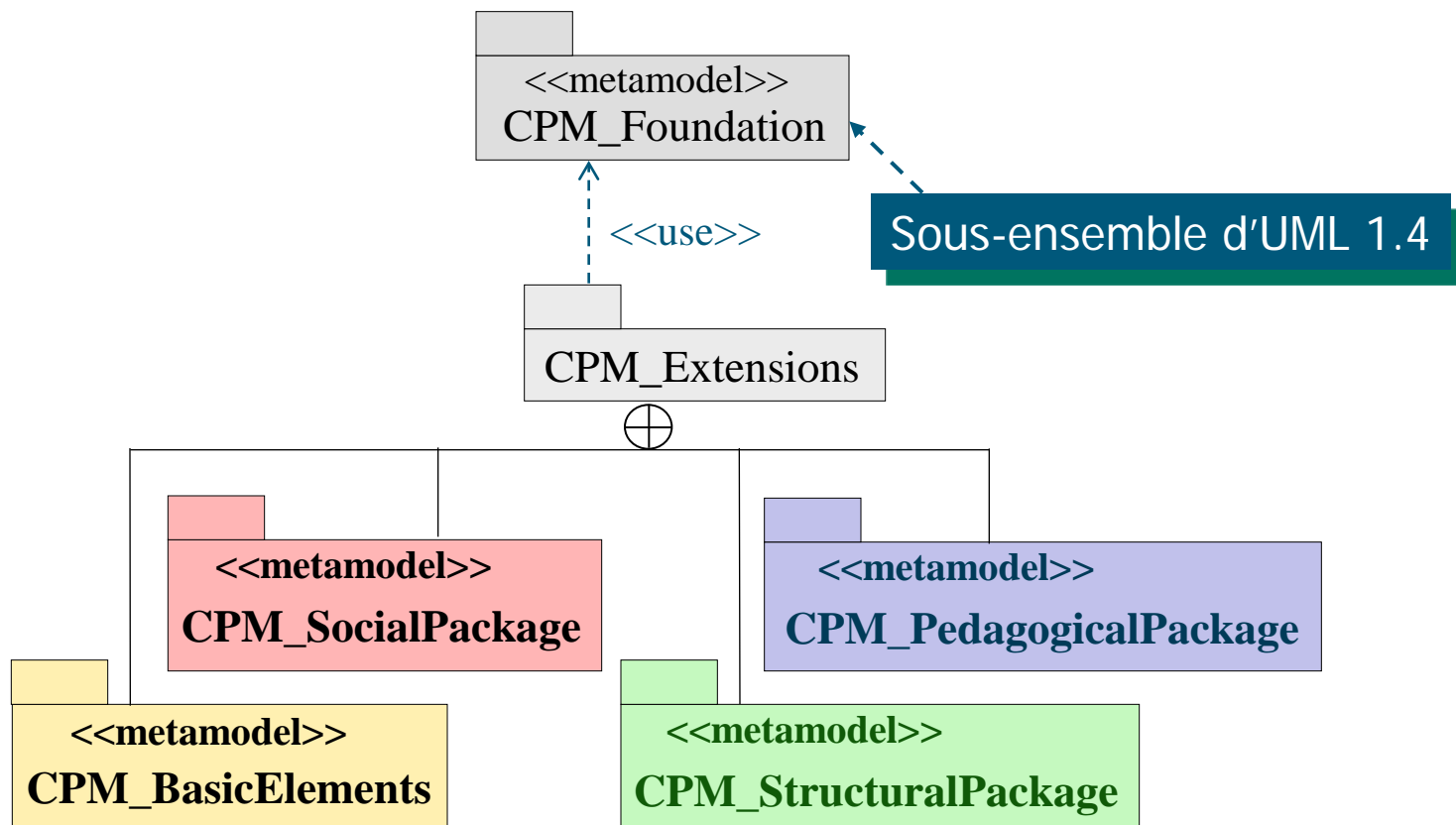
- ✓ A language dedicated to the specification and design of cooperative PBL situations (PBL concepts)



- ✓ A language focusing on the modeling of didactical choices

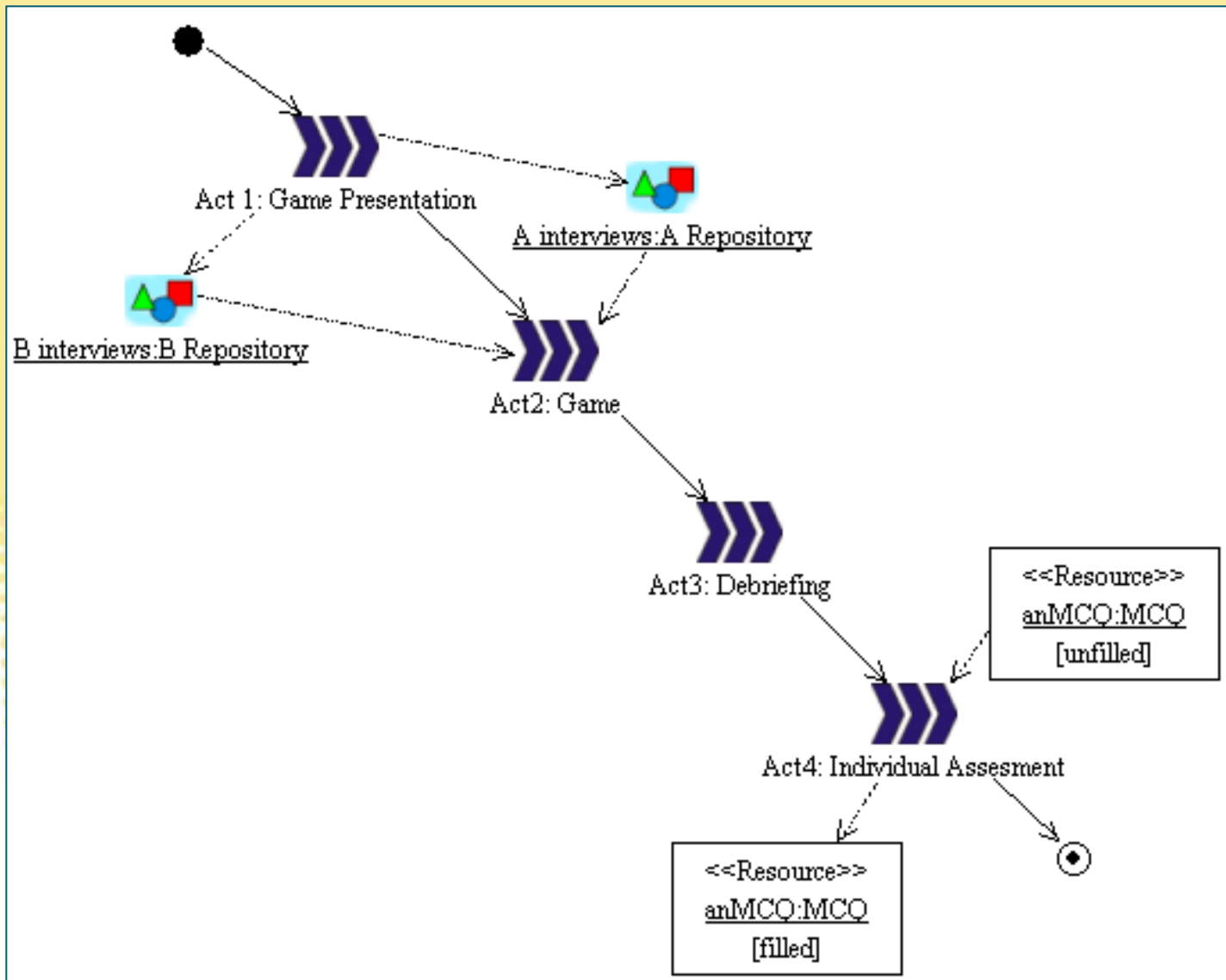
CPM : a UML Profile

- ✓ A graphical language on top of the UML Language (static models / dynamic models)



- ✓ A language supported by a toolset (CPM Profile)

General sequencing



Focus on the didactical transposition (1)

Name	Distance from sun (million kms)	length of day	length of year (Earth year/day)	composition	Temperature (K)	Diameter (km)
Mercury	58	59 days	88 days	solid	100-700 (mean 452)	4878
Venus	108	244 years	225 days	solid	726	12104
Earth	150	24 hours	365 days	solid	260-310	12756
Mars	228	25 hours	687 days	solid	150-310	6787
Jupiter	778	10 hours	12 years	gas	120	142796
Saturn	1427	10 hours	29 years	gas	88	120660
Uranus	2872	17 hours	84 years	gas	59	51118
Neptune	4509	16 hours	165 years	gas	48	48600
Pluto	5916	6 days	248 years	solid	37	2274

Solid Planets are near the Sun
Gaseous are not near the Sun
Exception : Pluto

Temperature determines Distance from the Sun
Exception: Venus

Little Planets are near the Sun
Giant Planets are not near the Sun
Exception: Pluto

Length of year determines Distance from the Sun

- ➔ A language to express learners knowledge (personal/shared views) and tutoring strategies at Domain level:
- Sun, Planet, Group of planets (Giant planets)
 - Planet properties (Distance from sun, length of day, composition, ...) and values
 - Adjacence of Planets, correlation of properties, Exception, ...

Focus on the didactical transposition (2)

Name	Distance from sun (million kms)	length of day	length of year (Earth year/day)	composition	Temperature (K)	Diameter (km)
Mercury	58	59 days	88 days	solid	100-700 (mean 452)	4878
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A Team

B Team

Both teams



Didactical choices:

A Team

- must find the names of planets from the forum
- must discover some {distance / length of year / Temperature} values
- must correlate length of year / Distance properties
- must correlate Distance properties / Temperature properties
- must correlate length of year / Distance properties (B Team)
- should identify giant/solid planets from others
- should formulate exceptions

Focus on the didactical transposition (2)

Name	Distance from sun (million kms)	length of day	length of year (Earth year/day)	composition	Temperature (K)	Diameter (km)
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A Team

B Team

Both teams



Didactical choices:

B Team

- must discover some {distance / length of year / Temperature} values
- must correlate length of year / Distance properties
- must correlate Distance properties / Temperature properties
- should identify giant/solid planets from others
- should formulate exceptions

Focus on the didactical transposition (2)

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A Team

B Team

Both teams

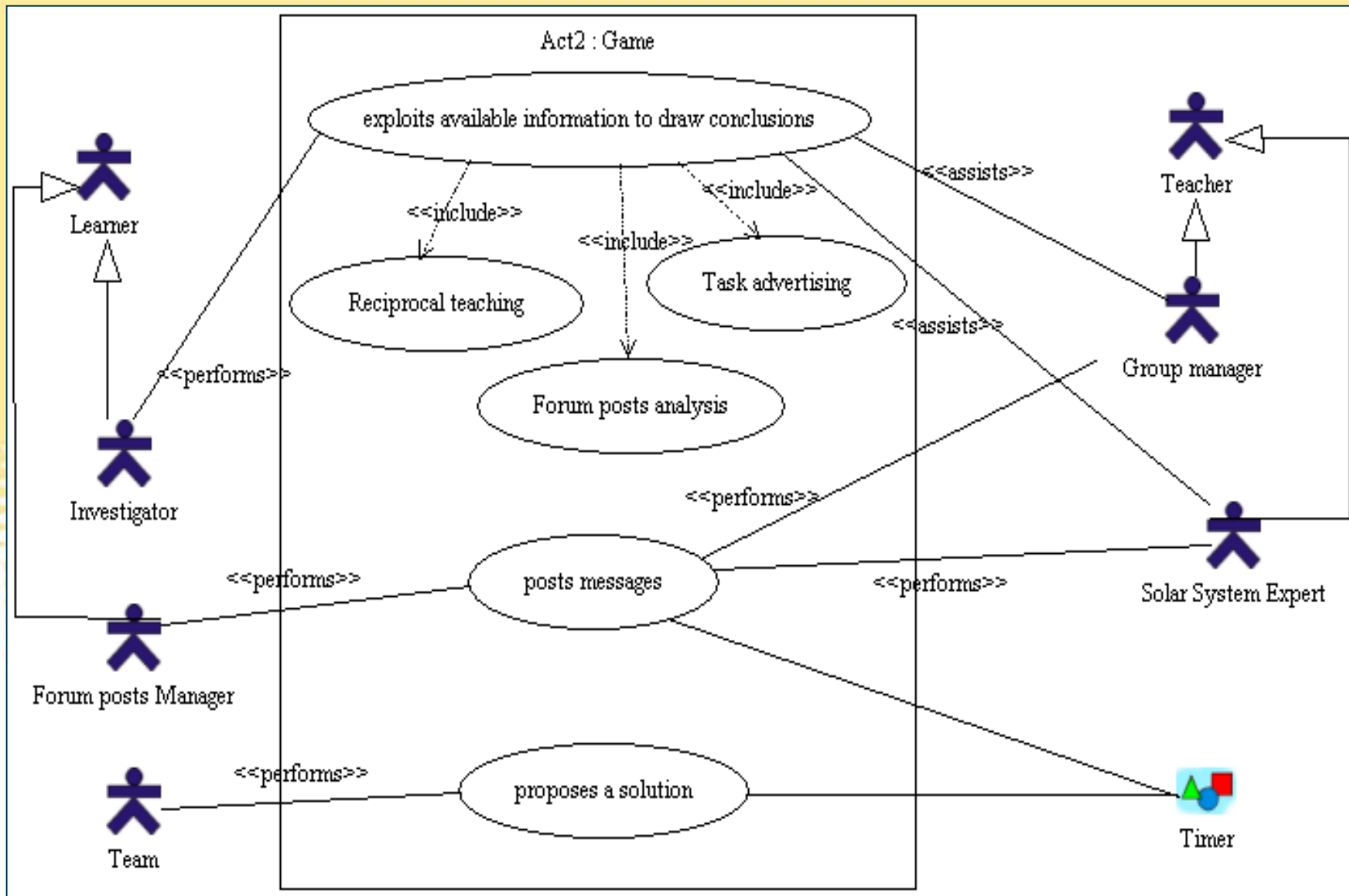


Didactical choices:

Tutor

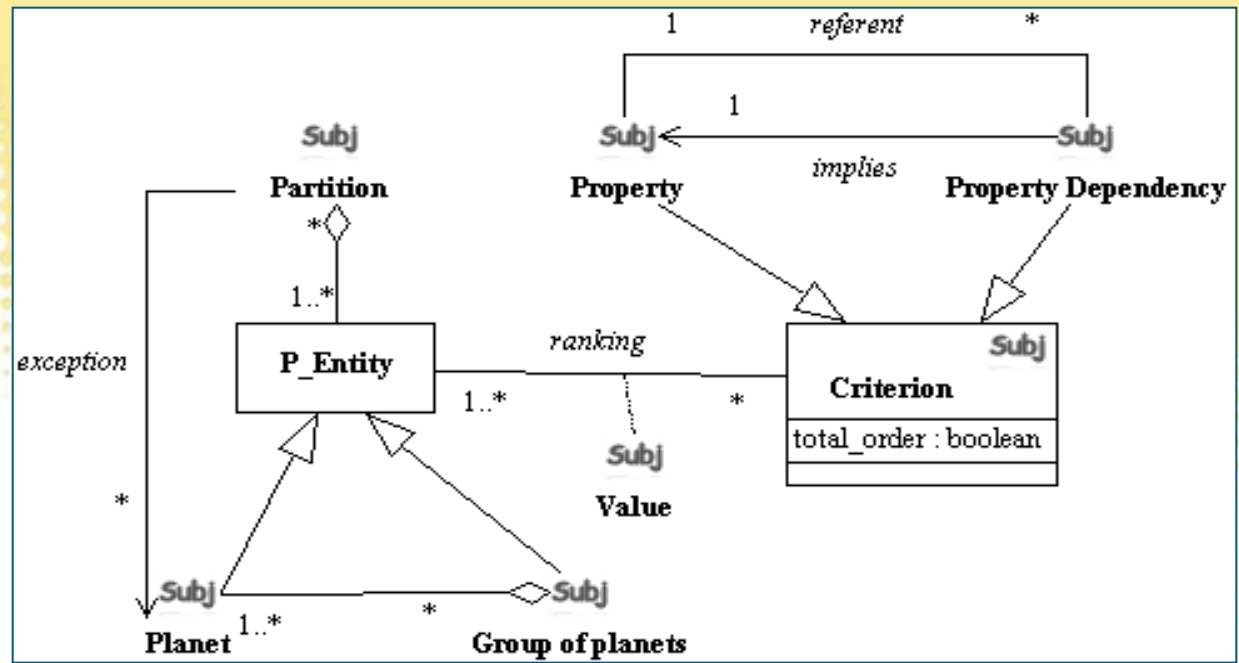
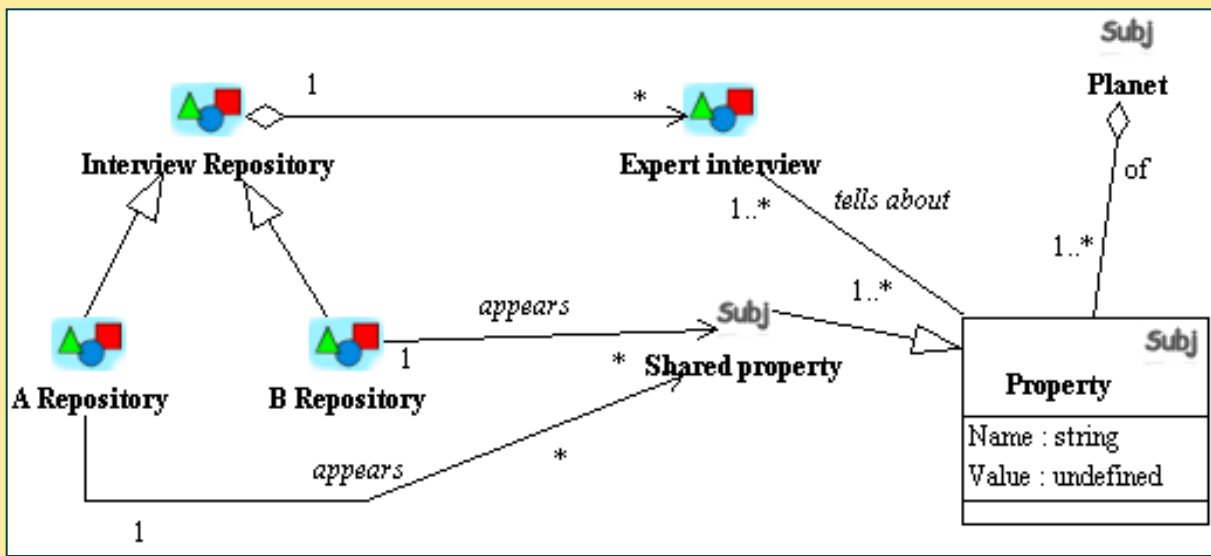
- must facilitate property correlations (and exception discovery)
- must assist Teams when they fail to discover important properties (via posts in the forum)
- must assist Teams asking precise questions / analysing the posts in the forum

Details of Act2: Game



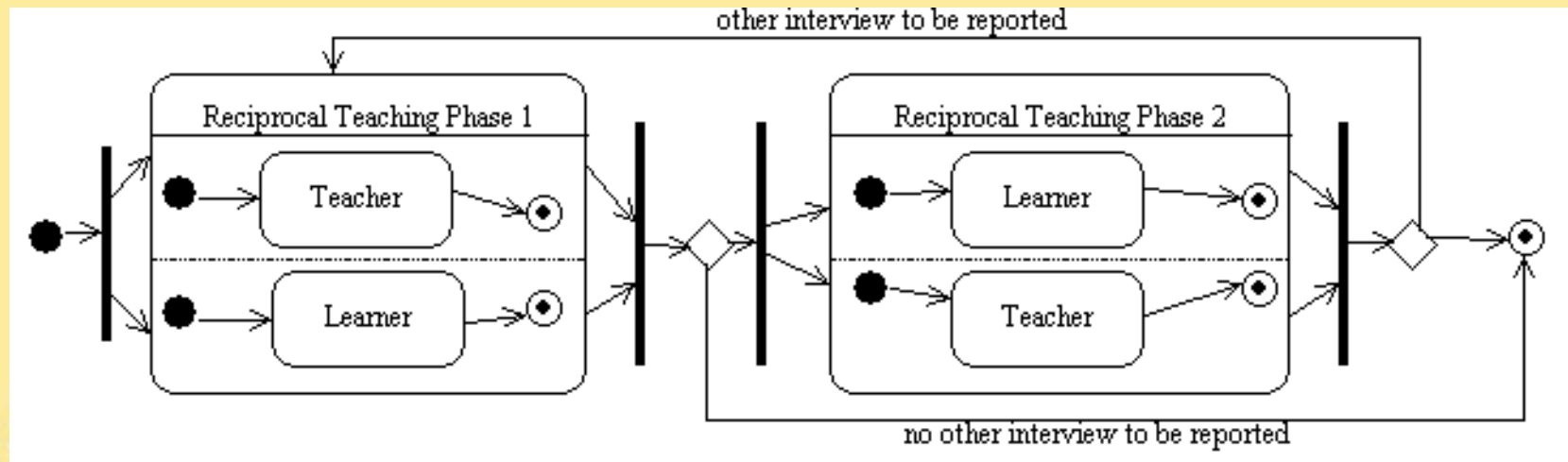
Focus on the didactical transposition (2)

Part 2: Snapshots of the Planets
Game specification

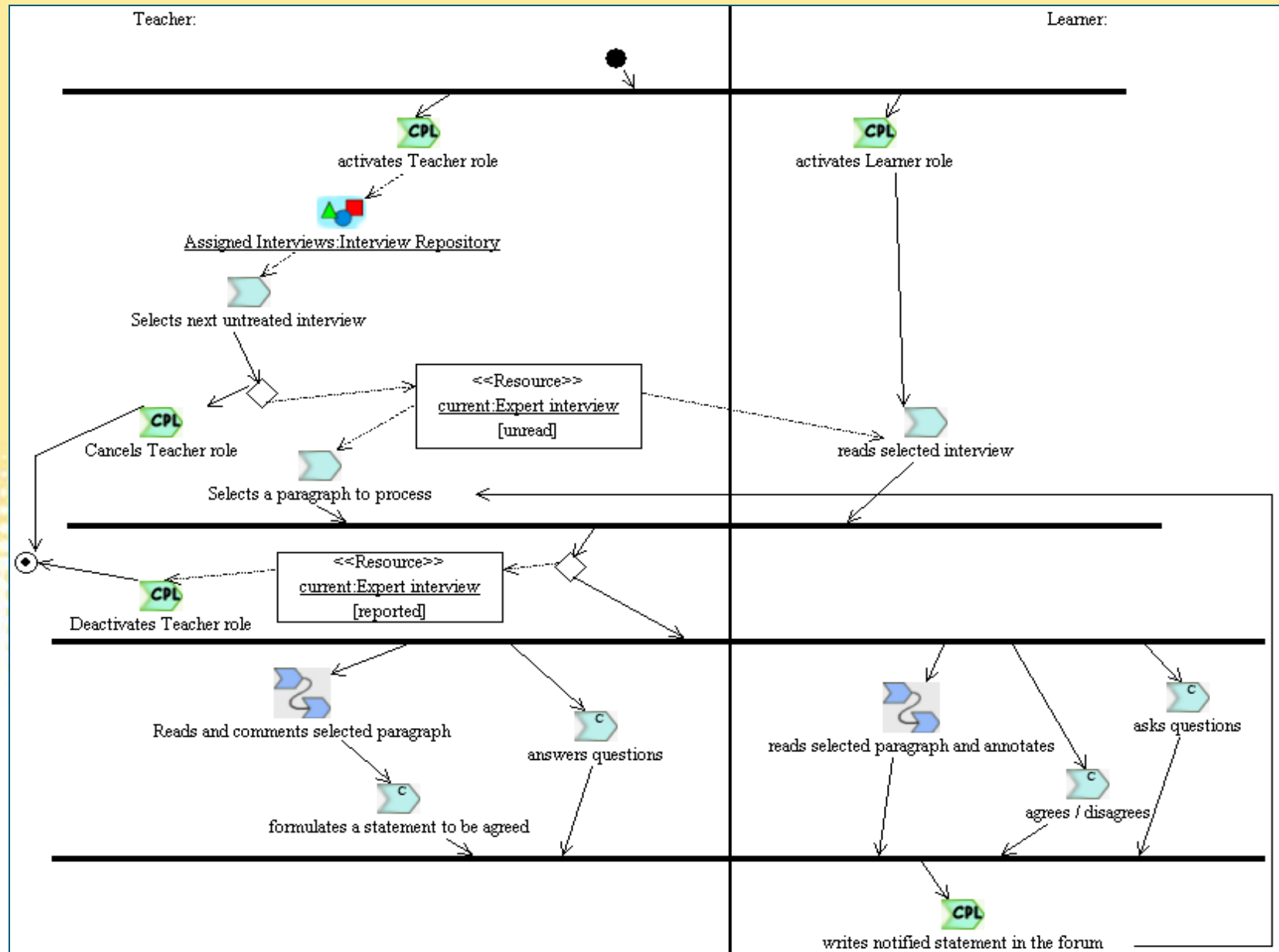


Focus on the Reciprocal Teaching use-case (1)

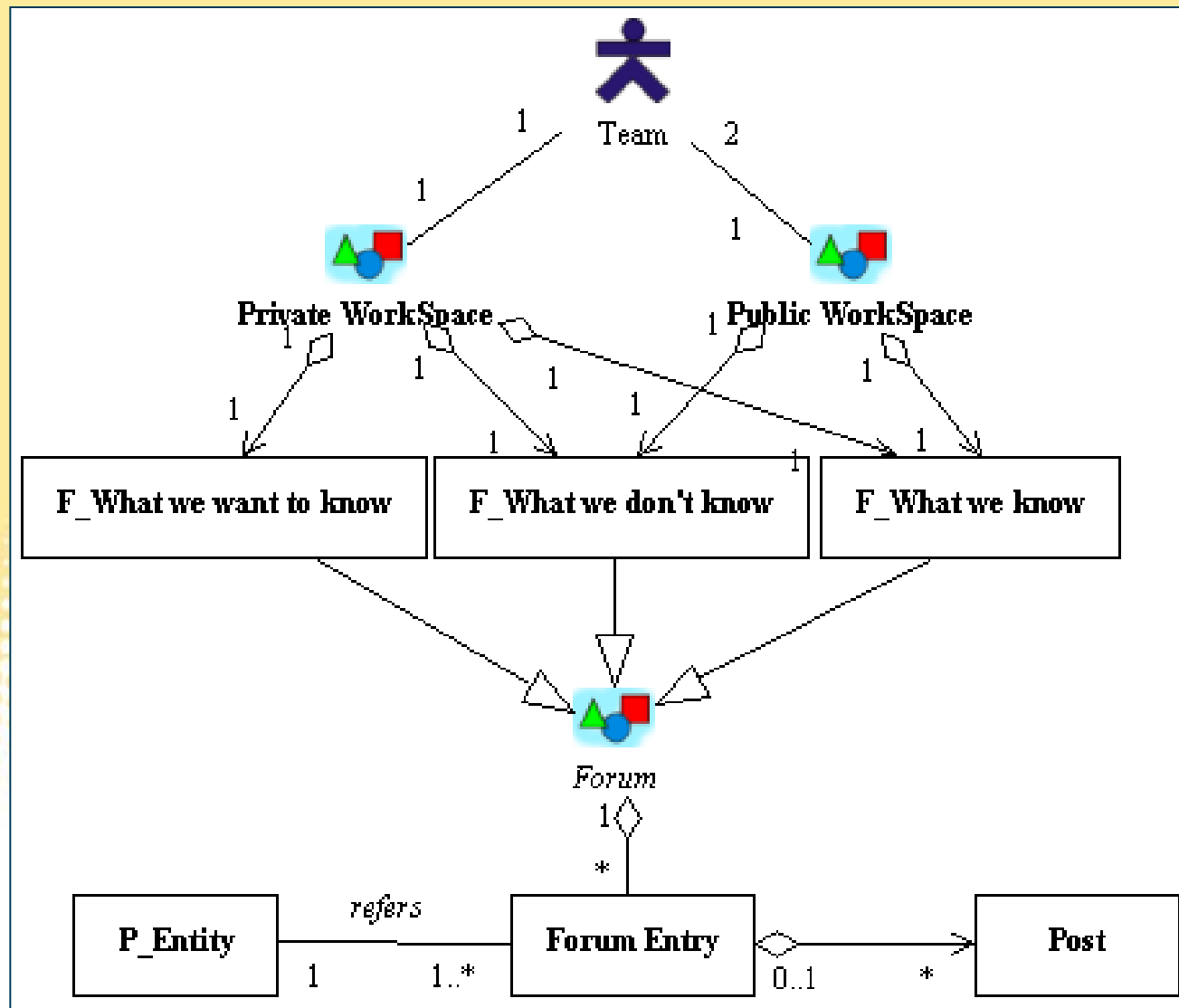
✓ Modelling Reciprocal Teaching



Focus on the Reciprocal Teaching use-case (2)

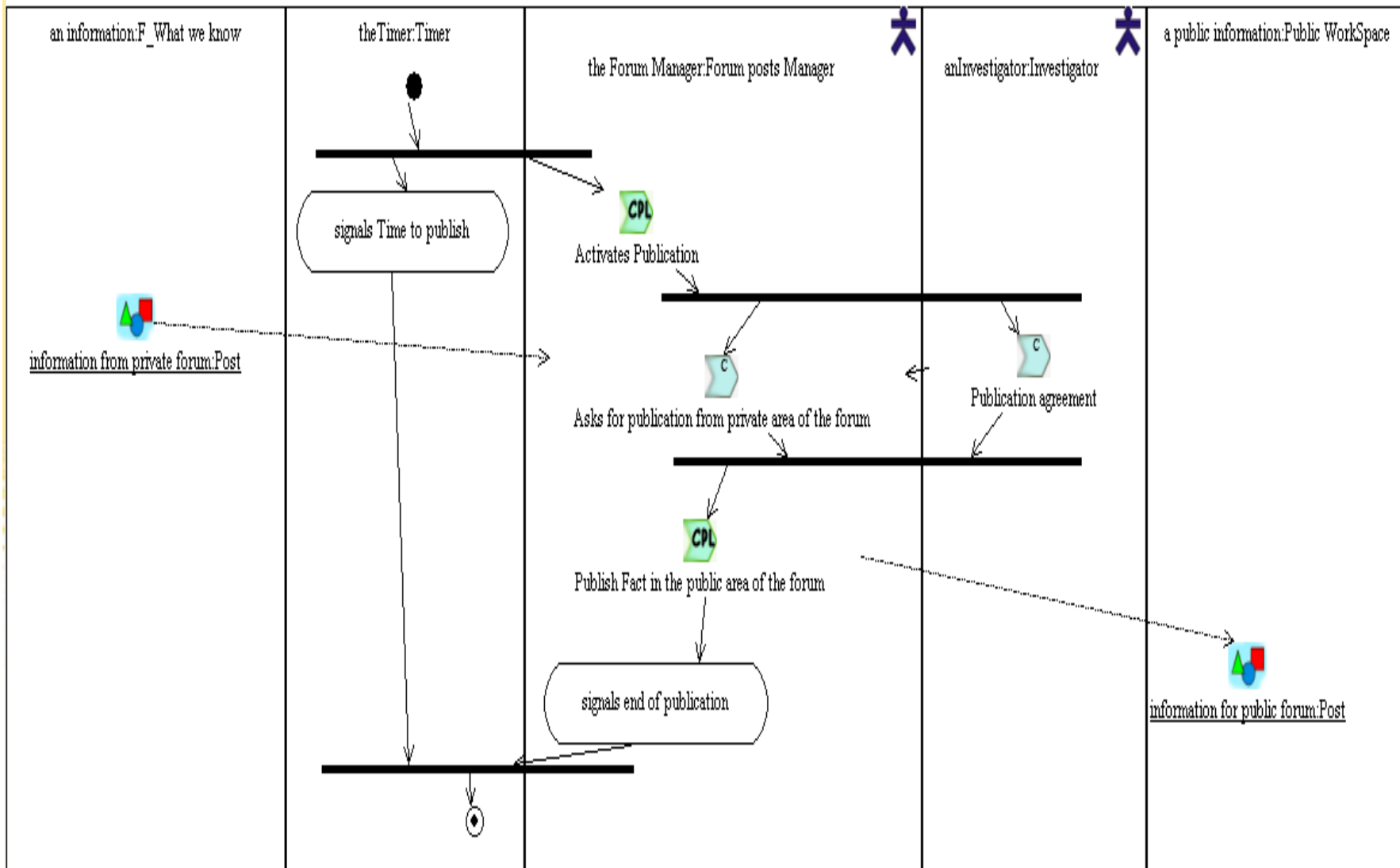


Focus on the Forum posts management (1)



Focus on the Forum posts management (2)

Part 2: Snapshots of the Planets
Game specification

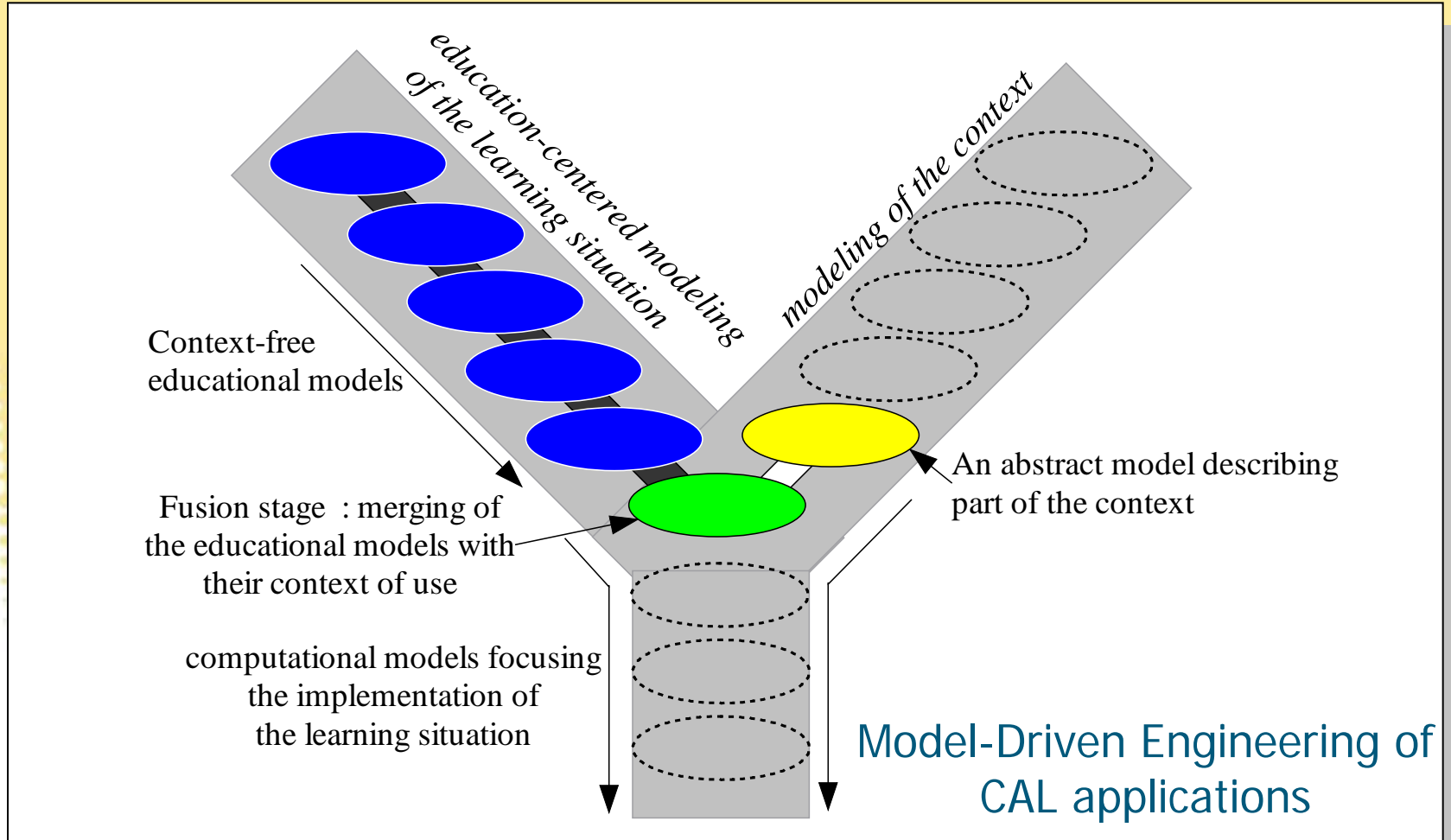


Discussion (1)

- ✓ Specifications from which agreements/disagreements can be expressed by pedagogues
 - ✓ Focus on the dynamics of teaching/learning
 - a CPM specification \neq a script (a scenario)
 - A CPM specification = a set of complementary views including
 - Use case diagrams
 - Class diagrams
 - Statecharts
 - Activity Diagrams
 - Object Diagrams
- } making use of a dedicated PBLs vocabulary (ontology)
- ✓ Specifications are computable (transformations into IMS-LD compatible code, OCL checking, ...)

Discussion (2)

- ✓ From contextualized roles, resources and activities to contextualized services and tools



Thank you...



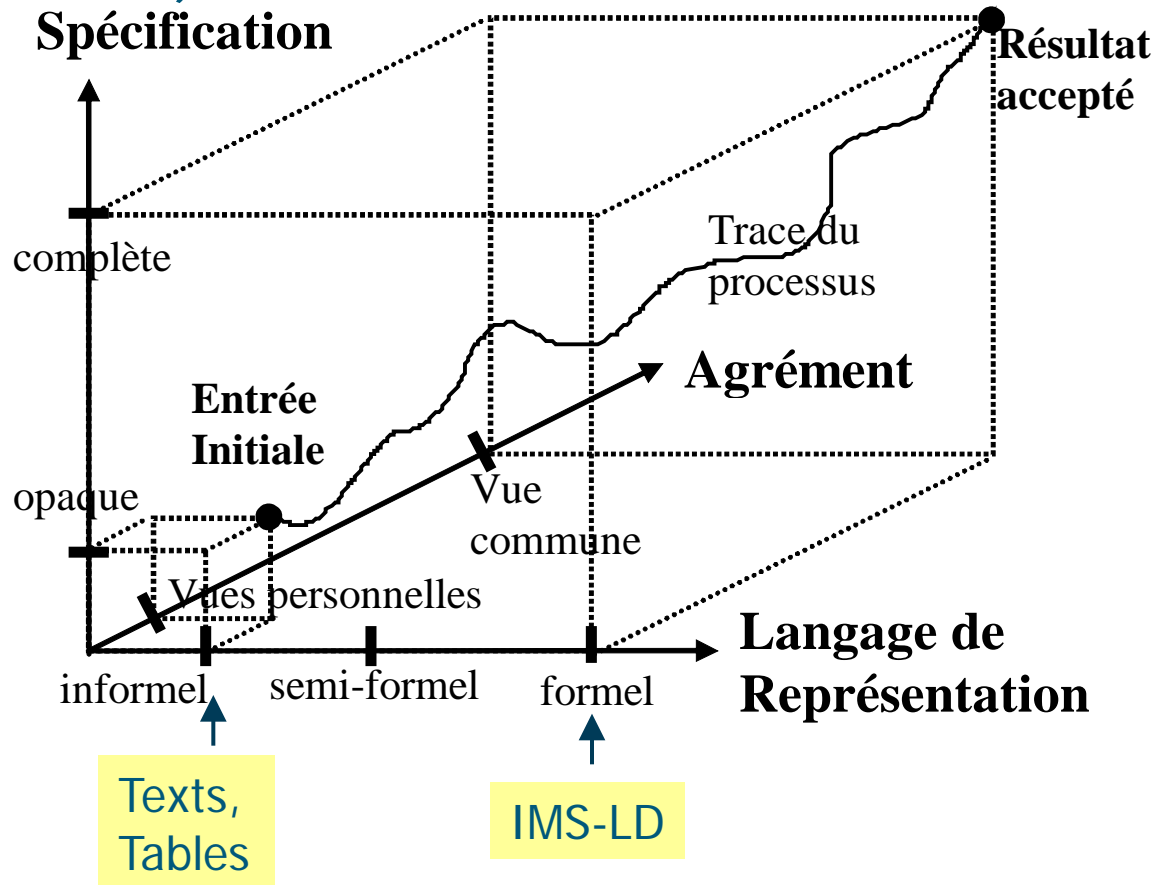
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About Modeling languages

✓ voir (Pohl, 94)



➔ *Designers agreements ?*