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LABORATORY FOR COMPUTER SCIENCE AND INFORMATICS

FCT FACULDADE DE CIÊNCIAS E TECNOLOGIA
UNIVERSIDADE NOVA DE LISBOA

Usability evaluation of Domain-Specific Languages supported by USE-ME framework

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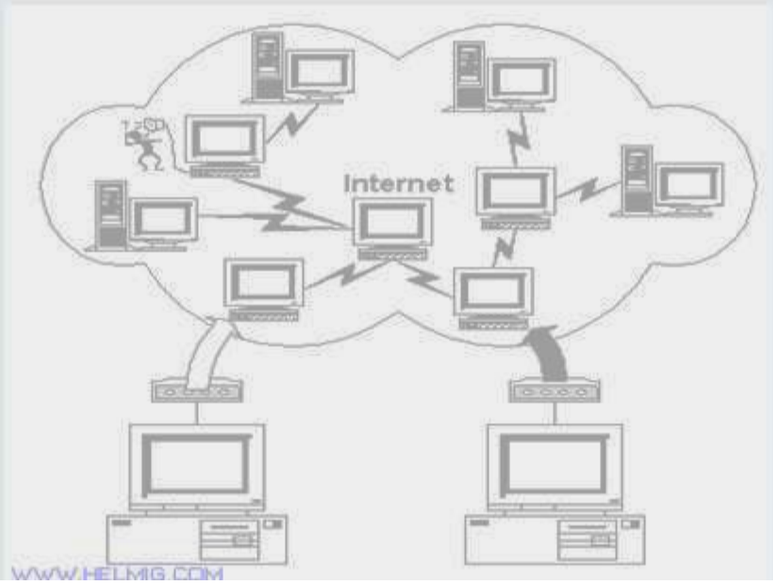
Domain-Specific Language

- Meant to close gap between PROBLEM DOMAIN and SOLUTION DOMAIN
- Reduce the use of computation concepts
- Focus on the domain concepts

- Increasingly popular
  - **Raise the abstraction level (closer to the domain)**
  - **Narrow the design space**
- Several benefits claimed, in well-defined domains
  - **Productivity gains**
  - **Better time to market**
  - **Avoid error-prone mappings between domain and software development concepts**
  - **Leverage the expertise of domain experts**

Language

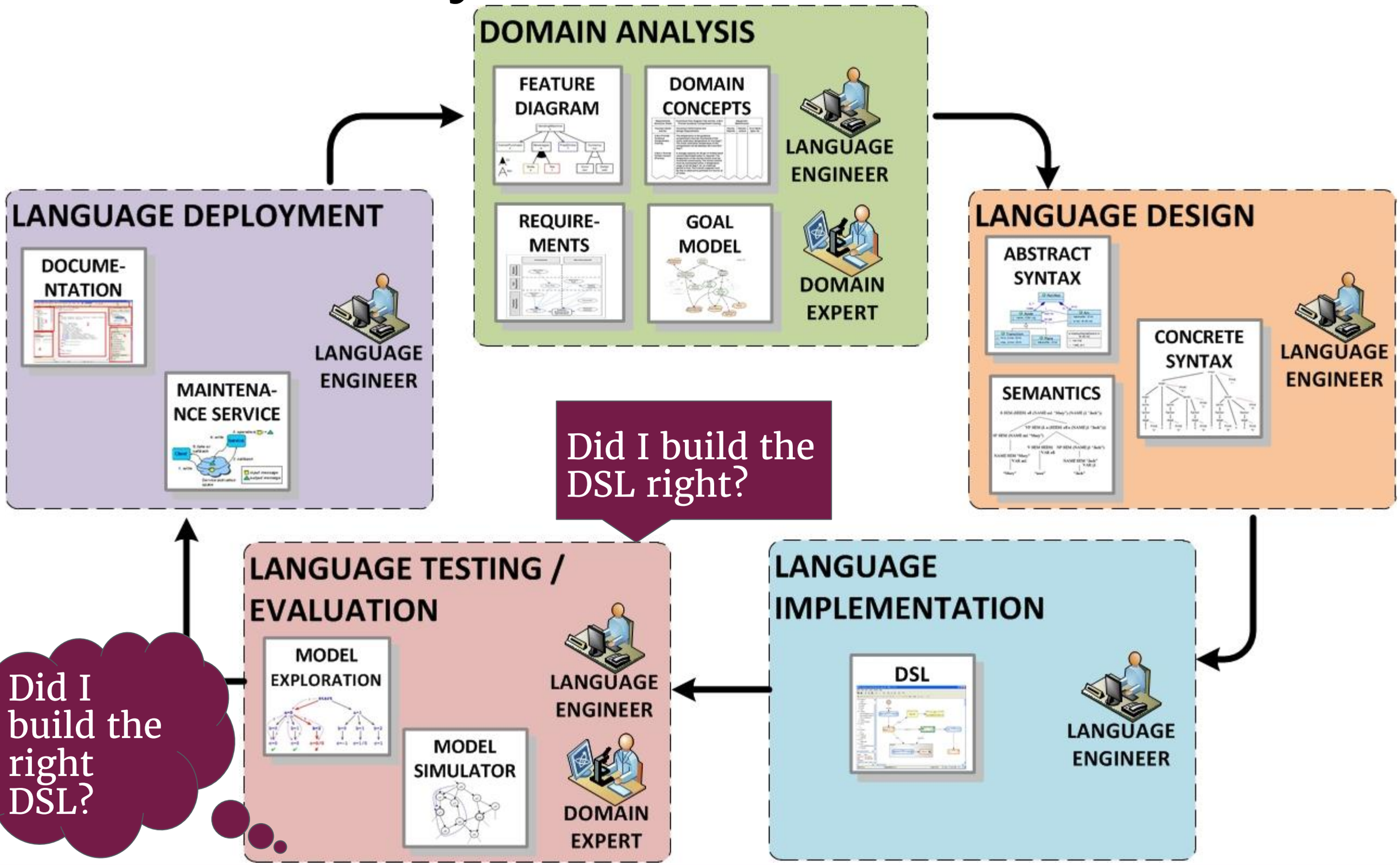
- A language is a means of communication

human2human	machine2machine	human2machine
Natural language	Protocol	User interface
		

- The user interface is a realization of a language

- A language is a model that describes the allowed terms and how to compose them into valid sentences

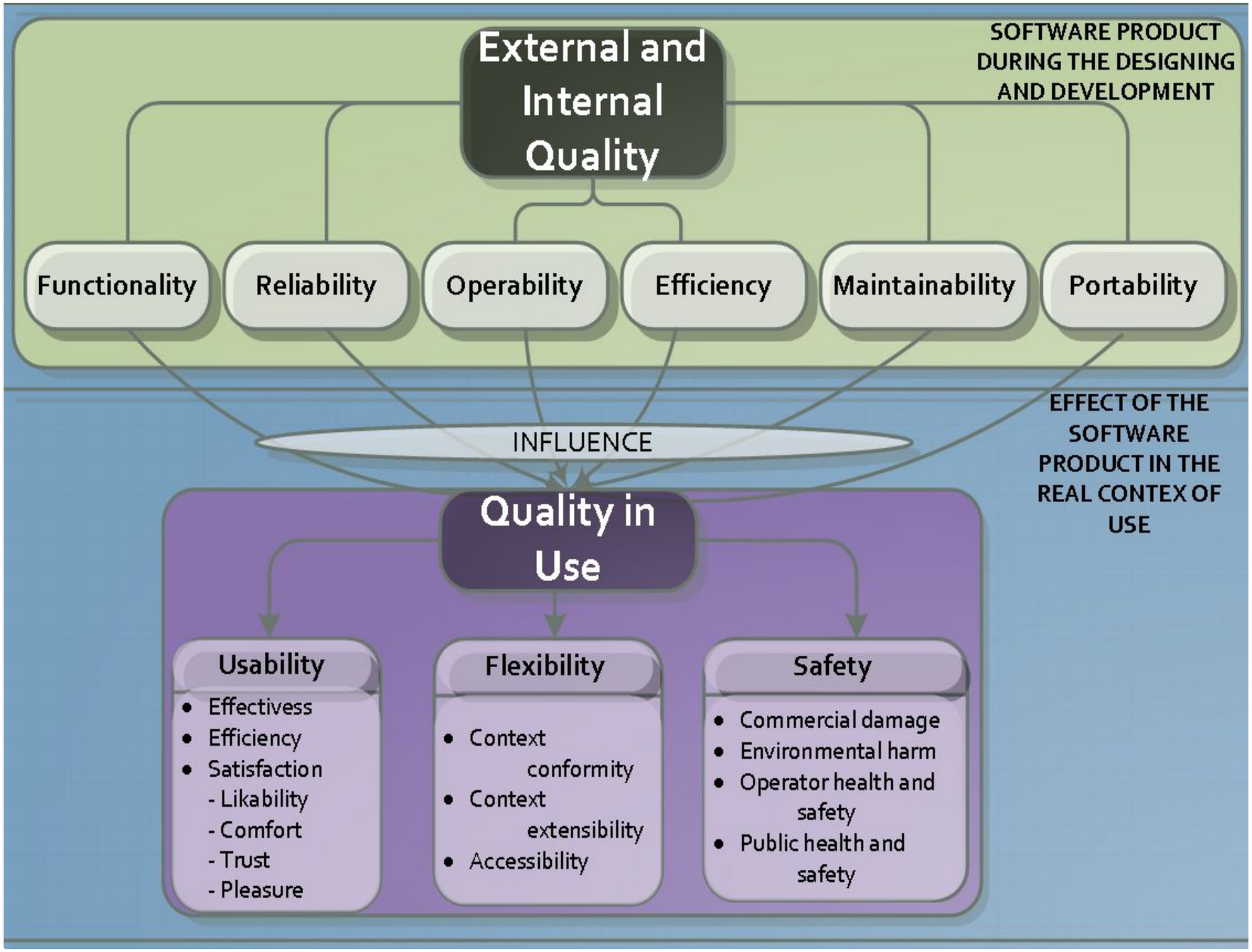
DSL Lifecycle



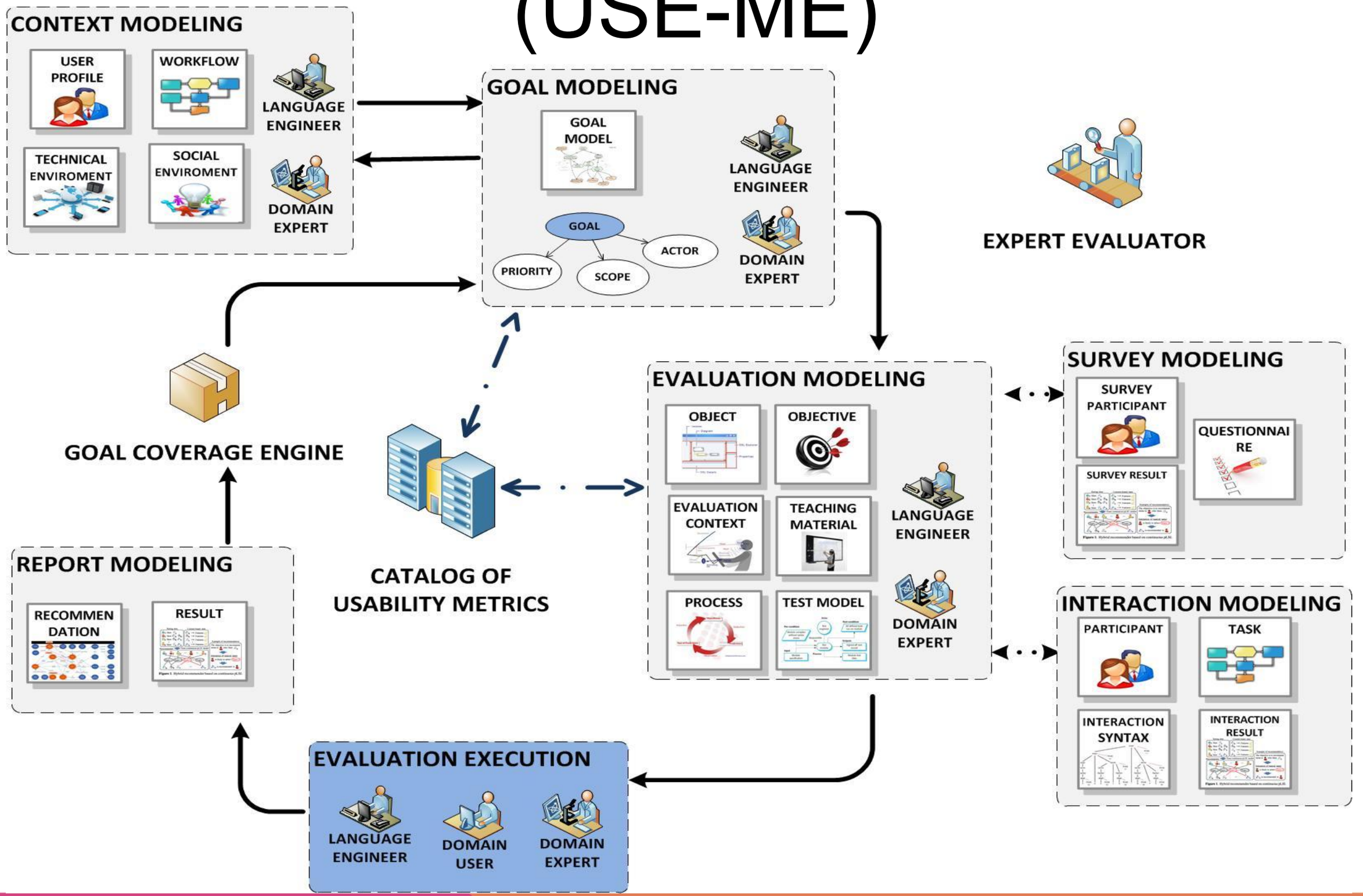
Quality in Use i.e. Usability

'The **capability** of a software product to enable specified users to achieve specified goals with: *effectiveness*, *productivity*, *safety* and *satisfaction*
in specified <u>contexts of use.'</u>

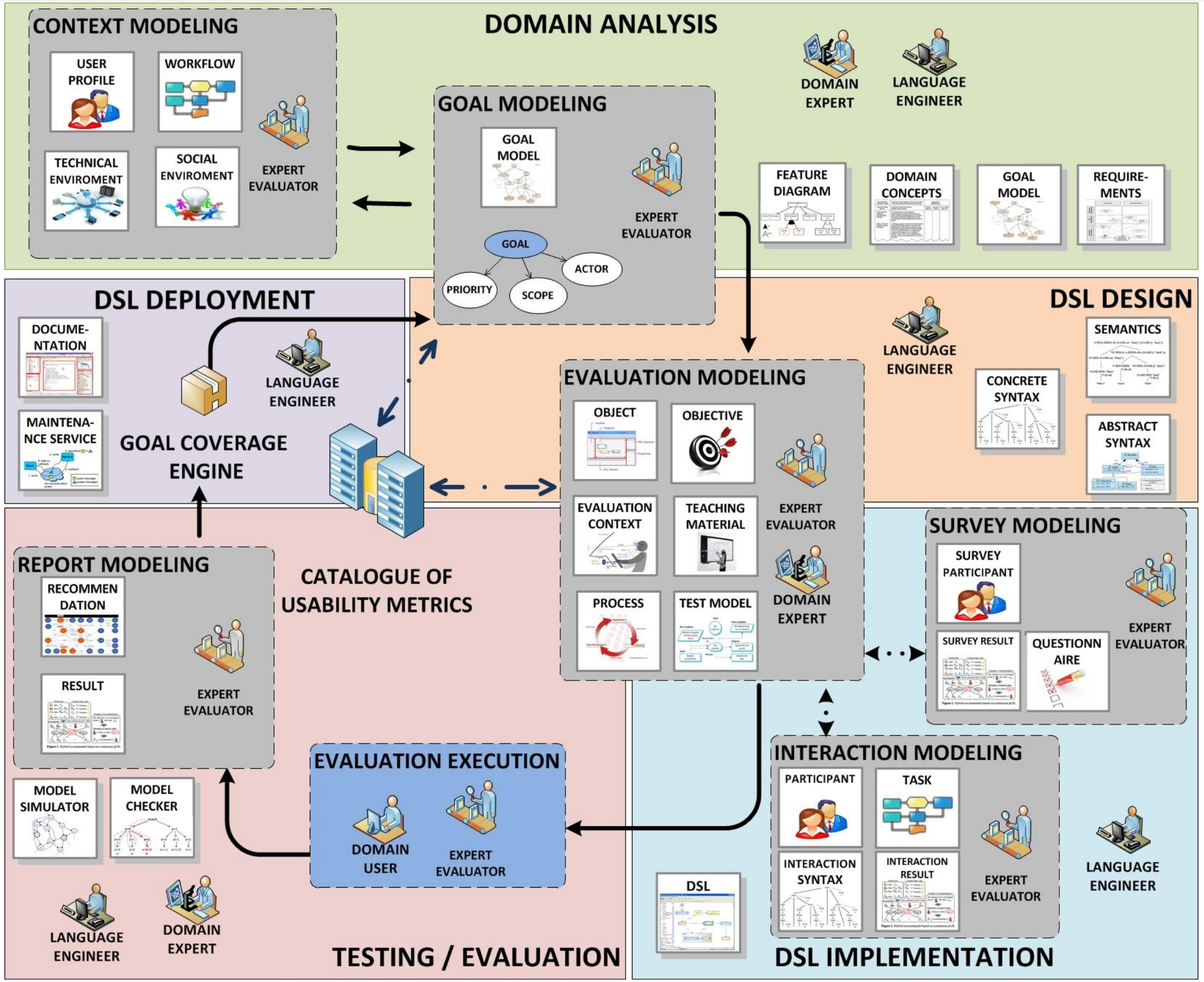
- Different languages likely have different *contexts of use*
- Their users are likely to have different *knowledge sets*
- A minimum set of ontological concepts is required to **use** the language

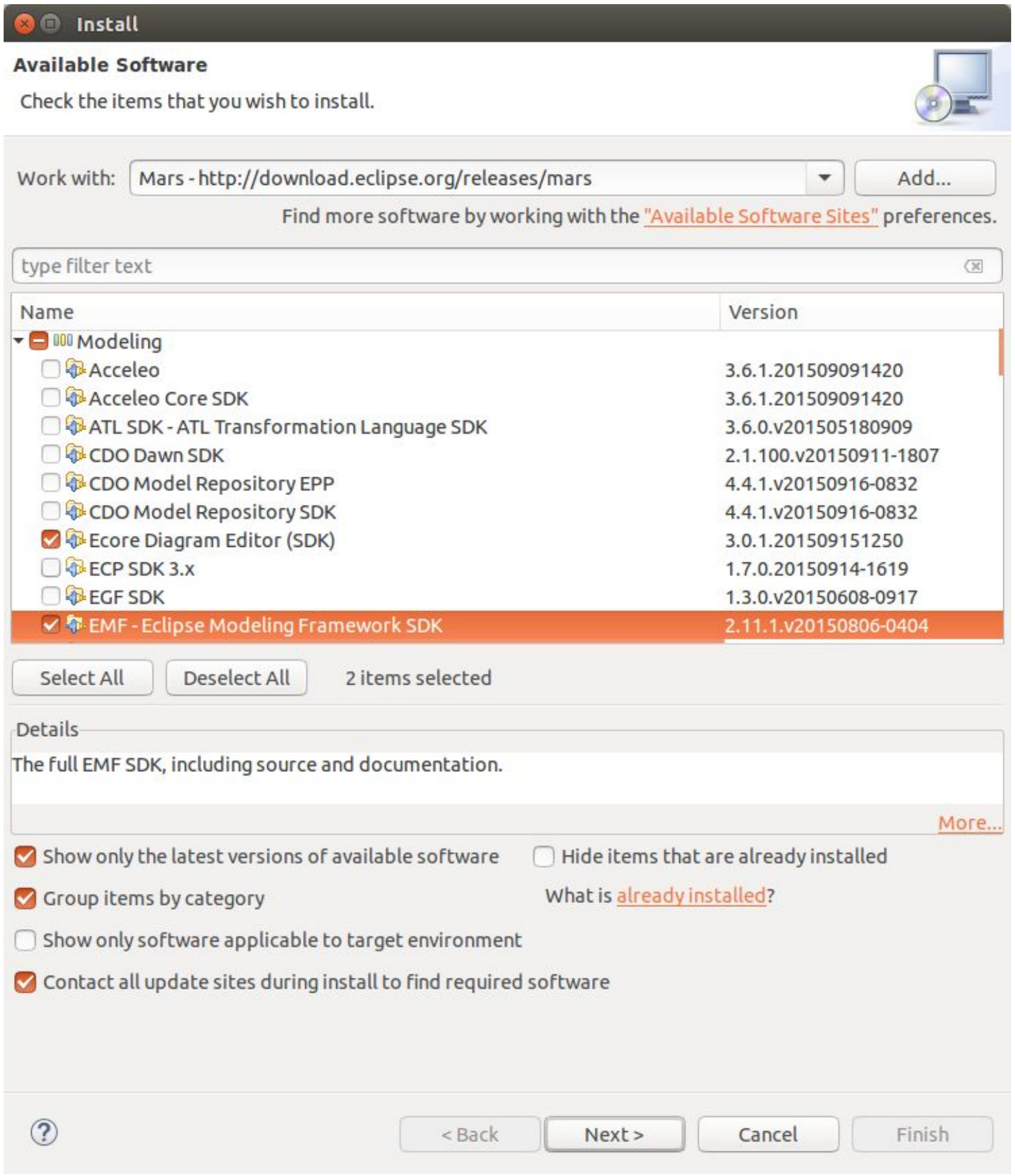


Usability Software Engineering - Modeling Environment (USE-ME)

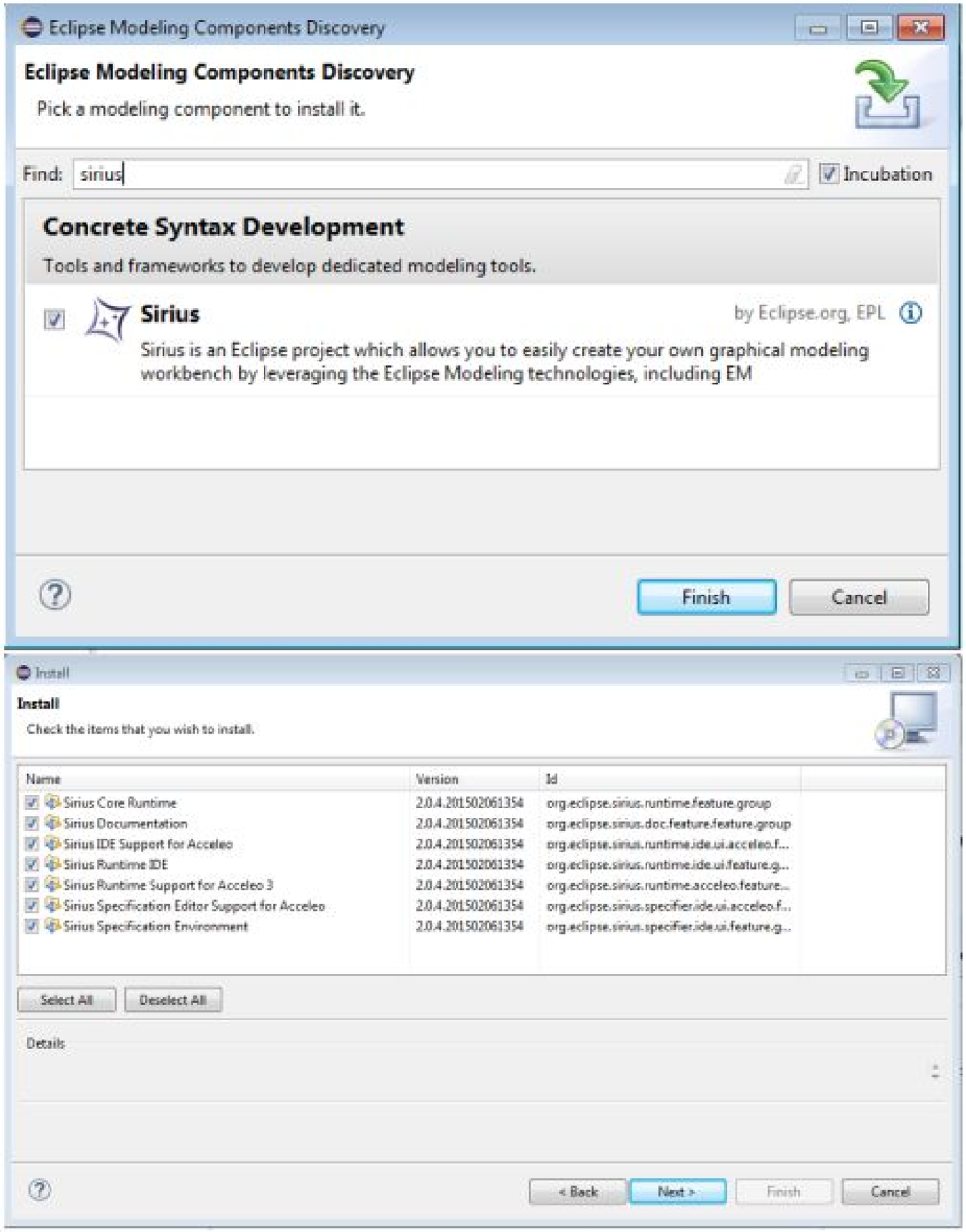


DSL lifecycle

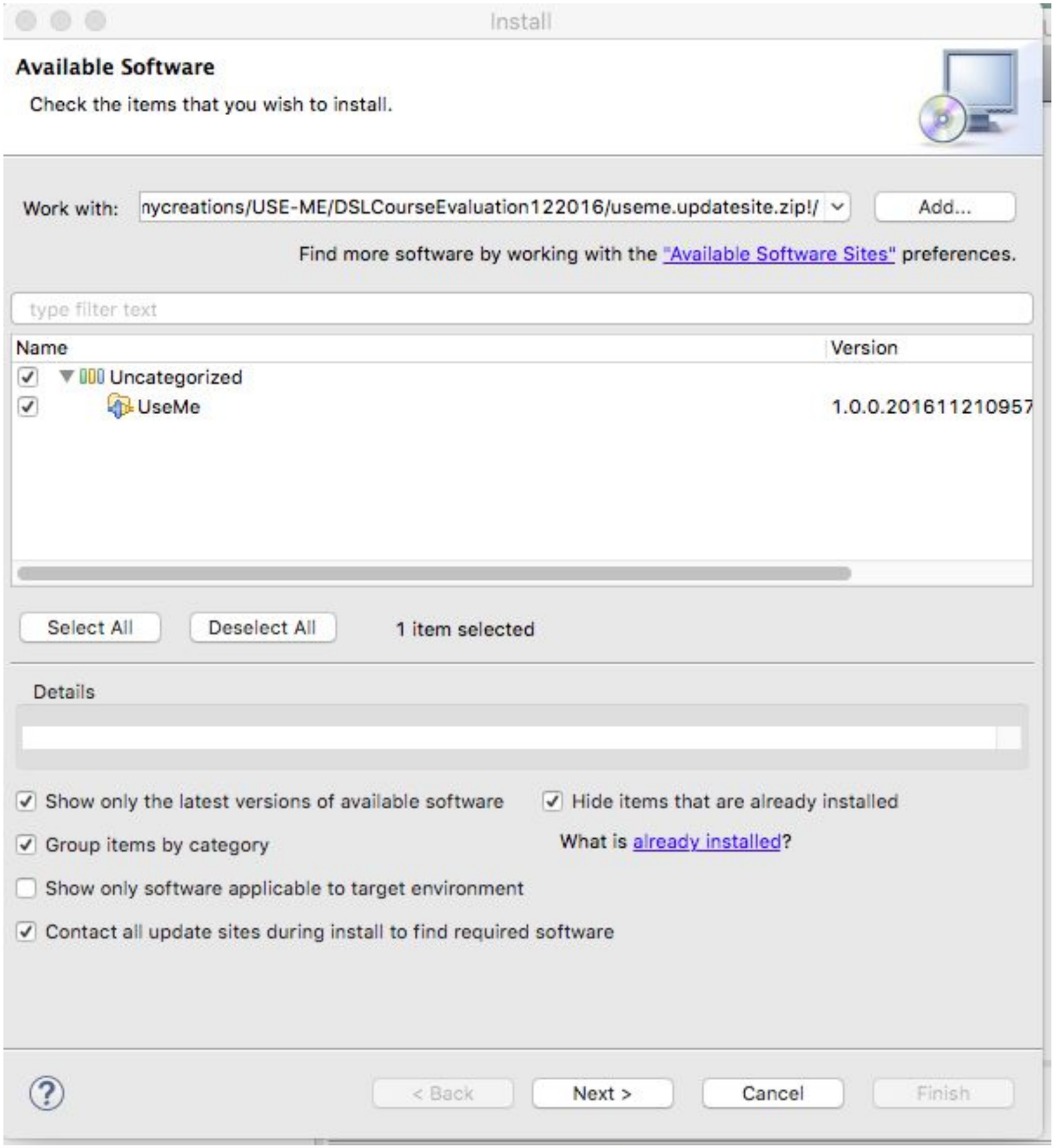




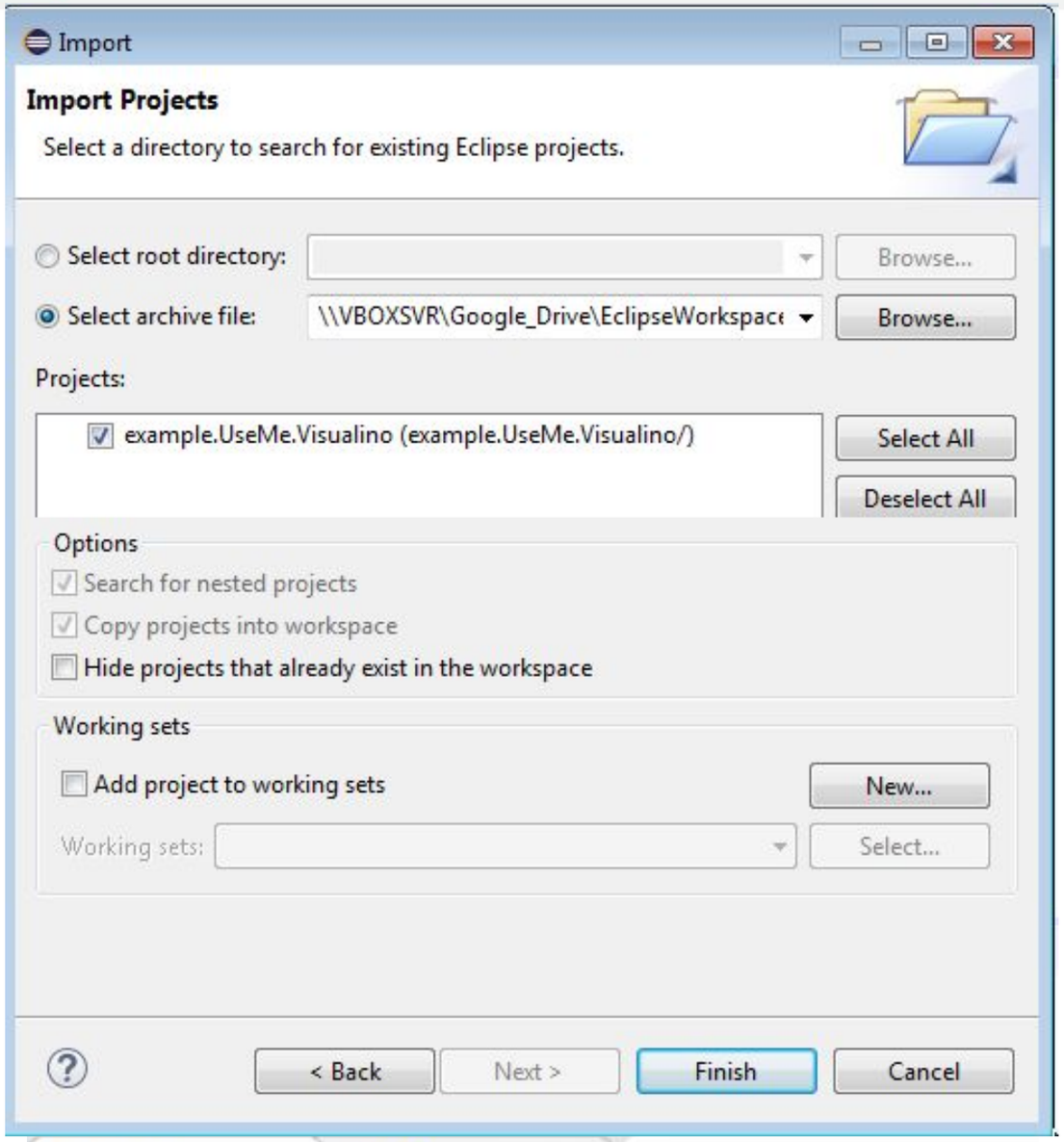
- Install EMF via the Eclipse Update manager from
- Help ▸ Install New Software….
- Select Modeling
- install EMF - Eclipse Modeling Framework SDK and the Diagram Editor for Ecore (SDK).
- Restart your Eclipse IDE after the installation.

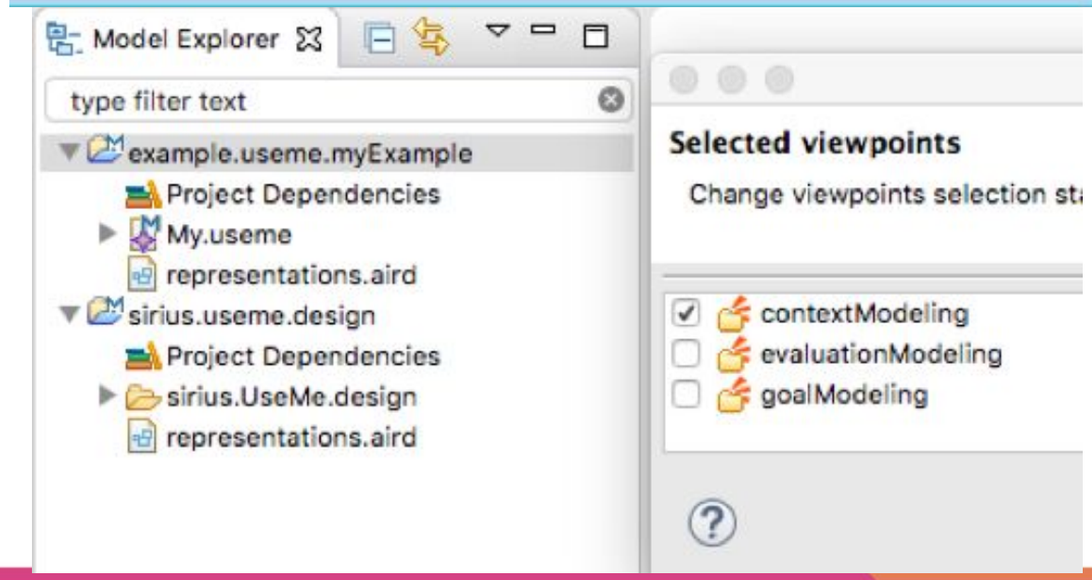


- Install Sirius via the Eclipse Update manager from
- Help ▸ Install Modeling Components
- Select Find and type 'Sirius'
- Select tool
- Click finish
- Select ‘all’ in Installation window and accept the license
- Restart your Eclipse IDE after the installation.



- Install USE-ME via the Eclipse Update manager from
- Help ▸ Install New Software….
- Select Add
- Select Archive and open the useme.updatesite.zip
- select all and click Next
- Accept the licence
- Restart your Eclipse IDE after the installation.



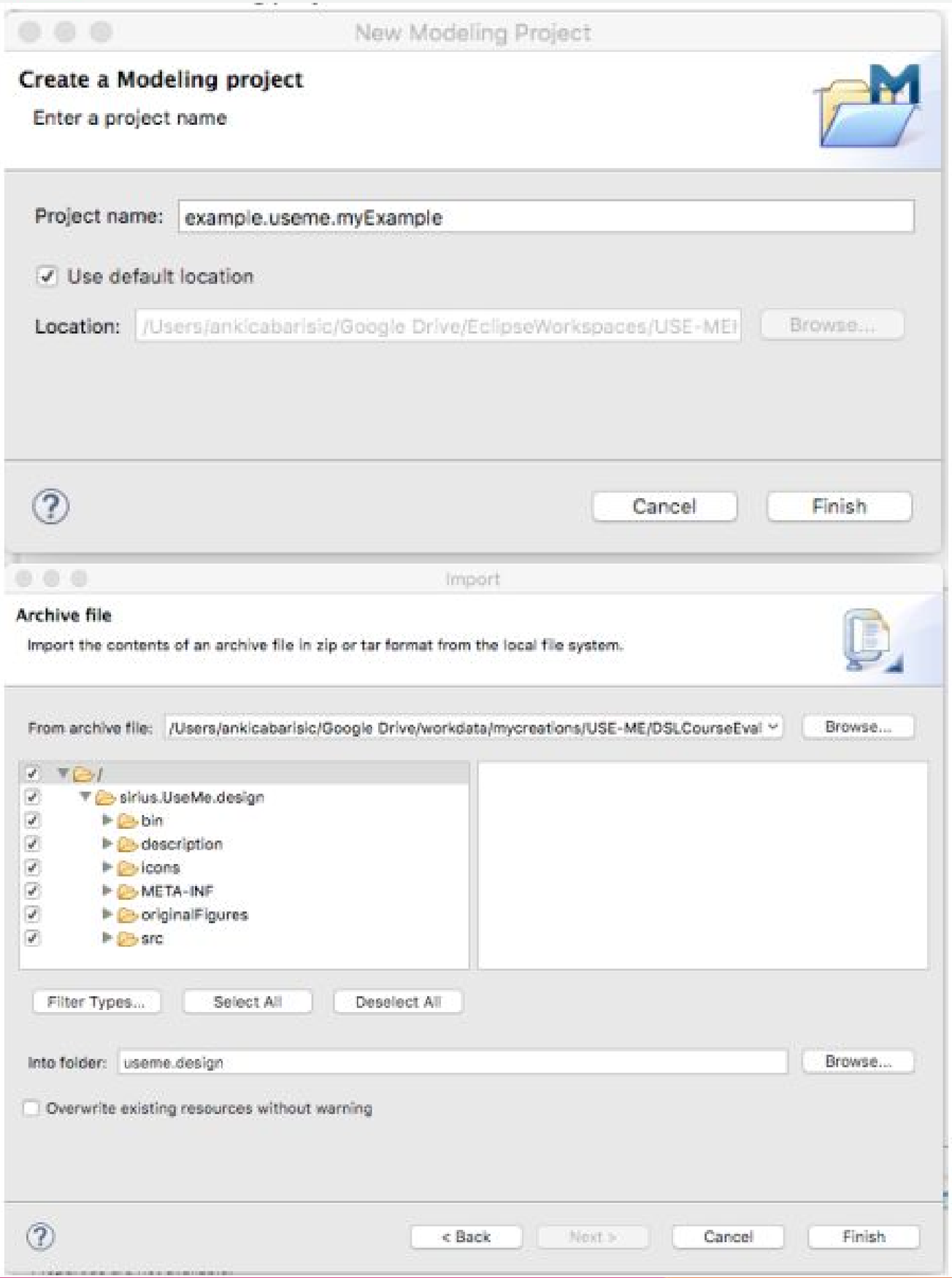


Import Visualino example:

- File->Import->Existing Projects into Workspace
- Select ‘From archive file’: example.UseMe.Visualino
- Right click on project to turn On Viewpoints

Each viewpoint diagram and its location element are described later. Graphical views are available for models created in modeling project. It is not still possible to use graphical editor to model.

Import existing project from archive: http://agile.csc.ncsu.edu/SEMaterials/tutorials/import_export/



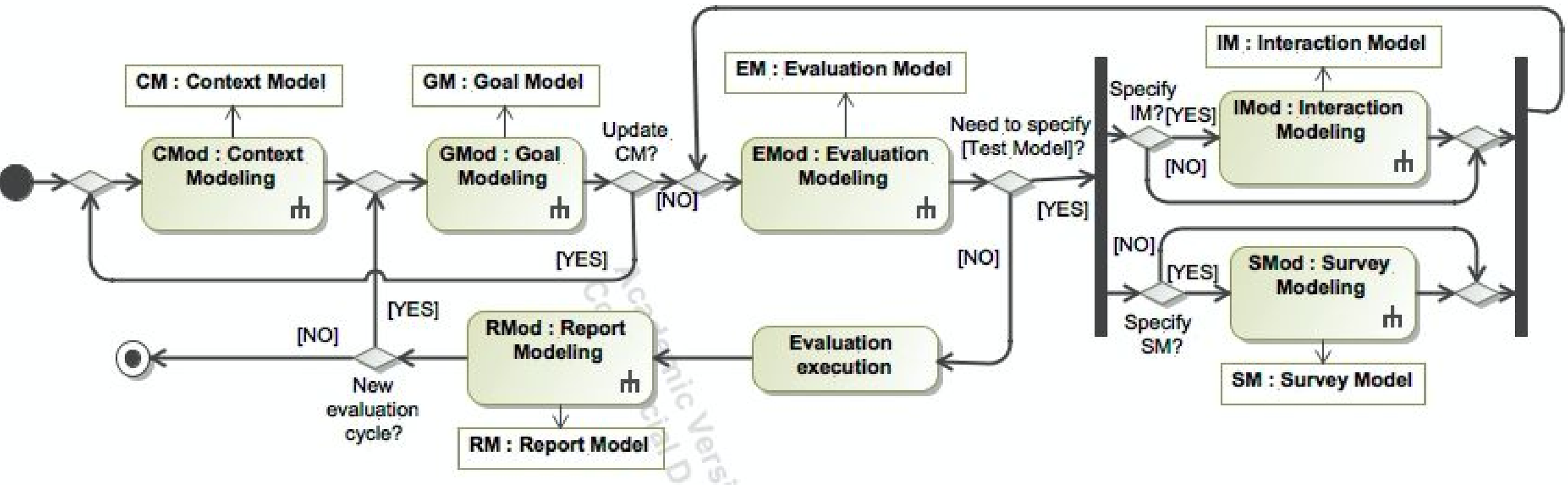
Create your modeling project:

- File->New->Modeling project
- Project name: example.useme.myExample
- File->New->Other->Example EMF Model Creation Wizards
- Select: UseMe Model
- Right click on project to turn On Viewpoints

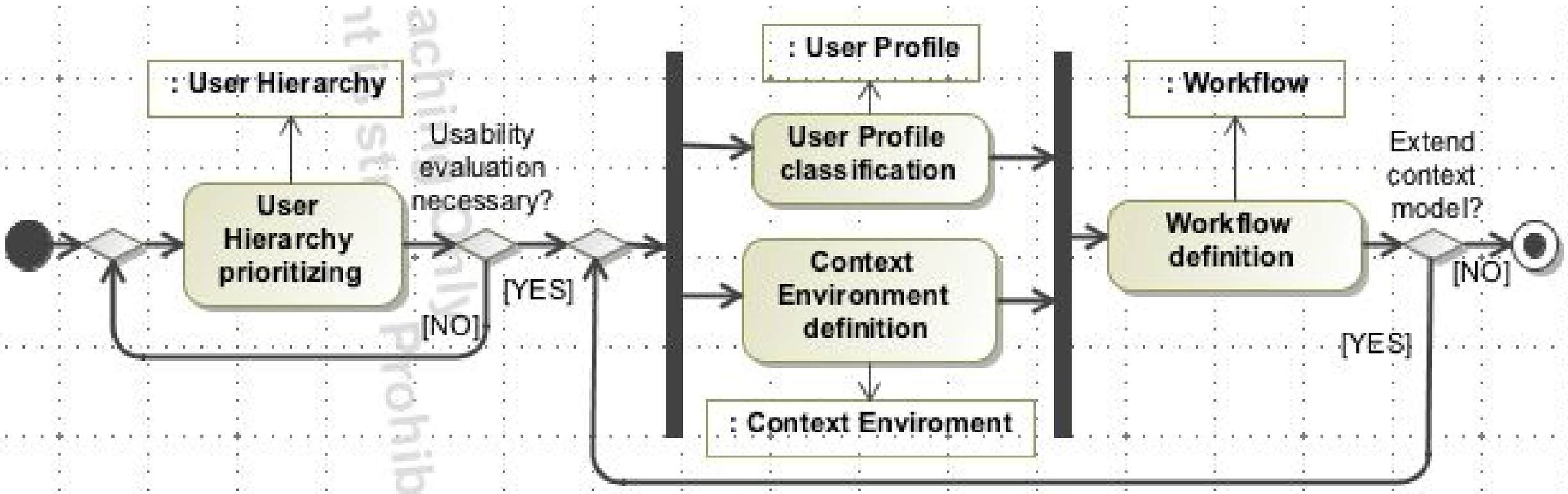
In the new useme model you should create new elements by using ecore editor.

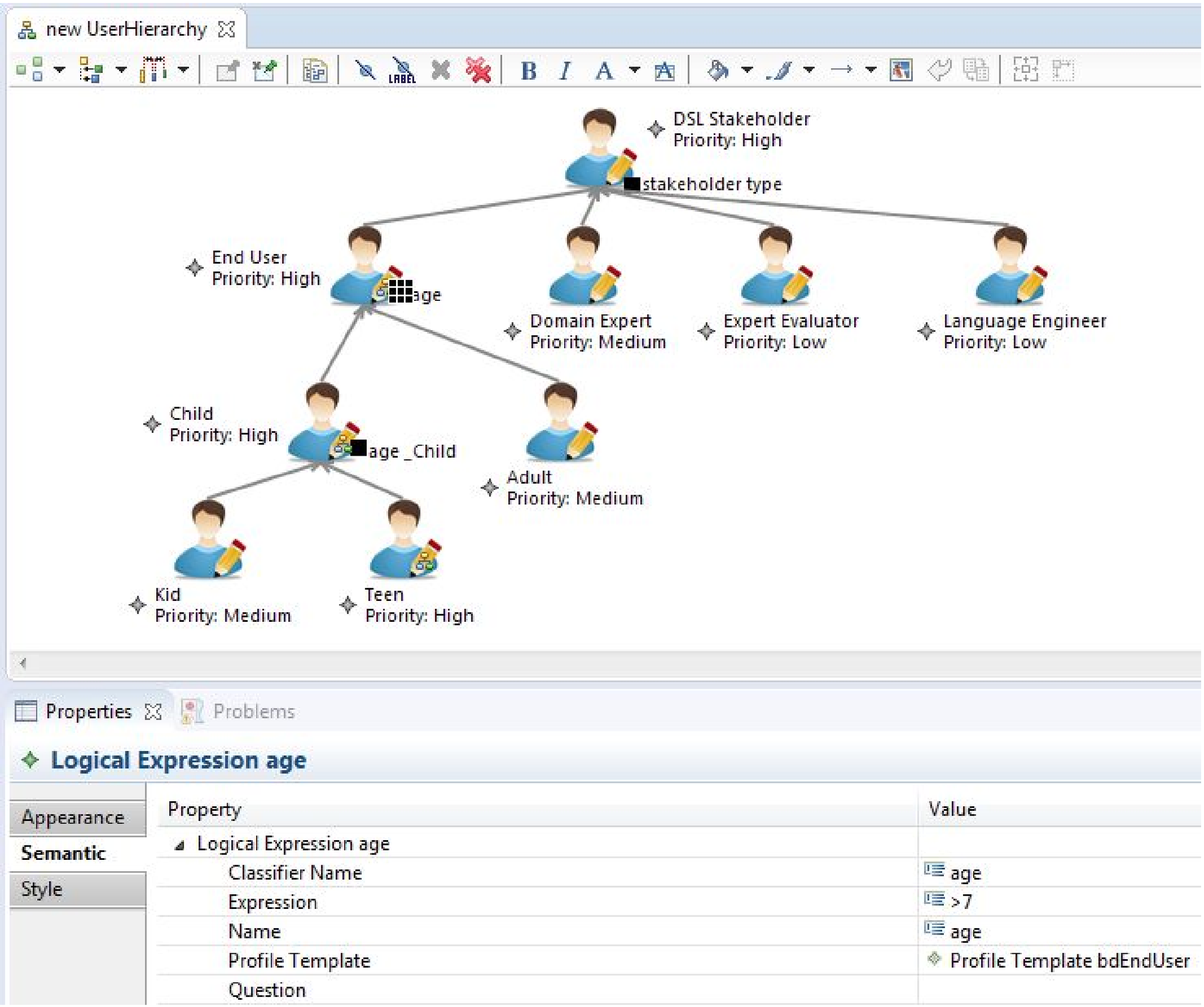
The graphical representation (described in following slides) is open by right click on the instantiated object, and selecting New Representation.

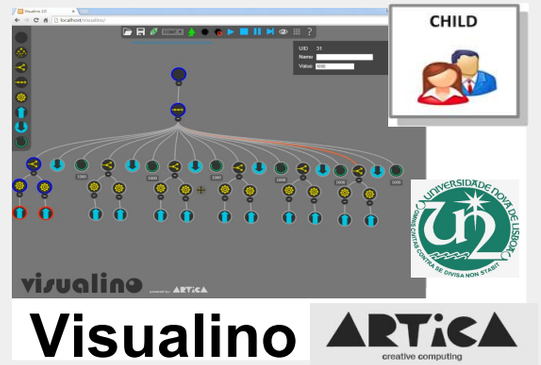
Usability Software Engineering - Modeling Environment (USE-ME)



Context Modeling (USE-ME)

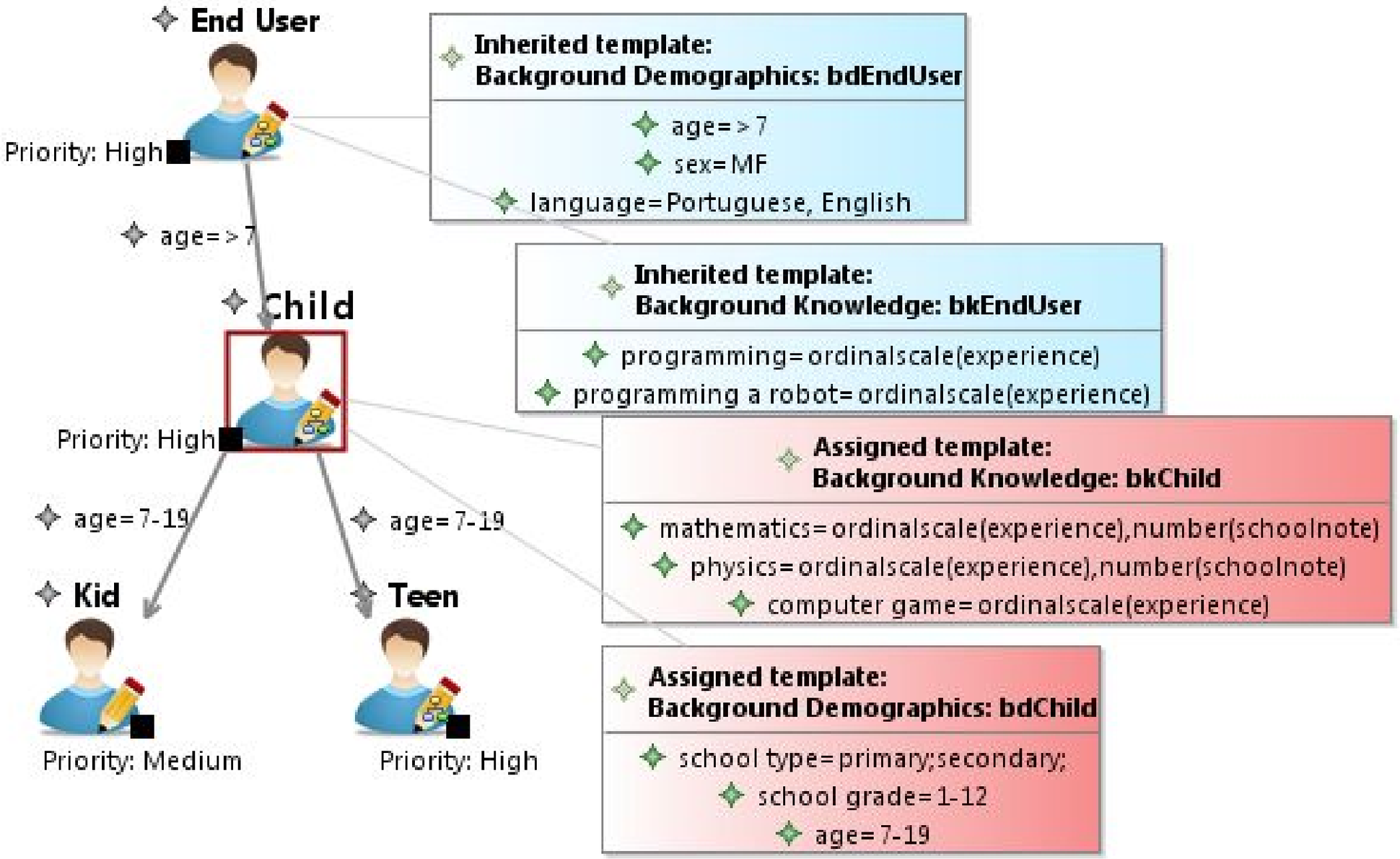


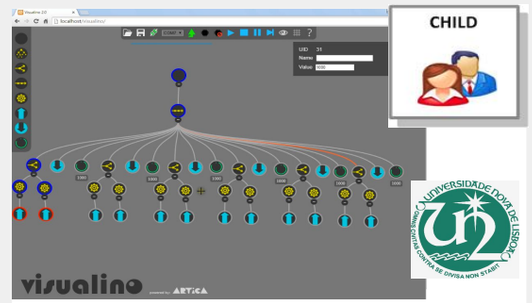




User Hierarchy

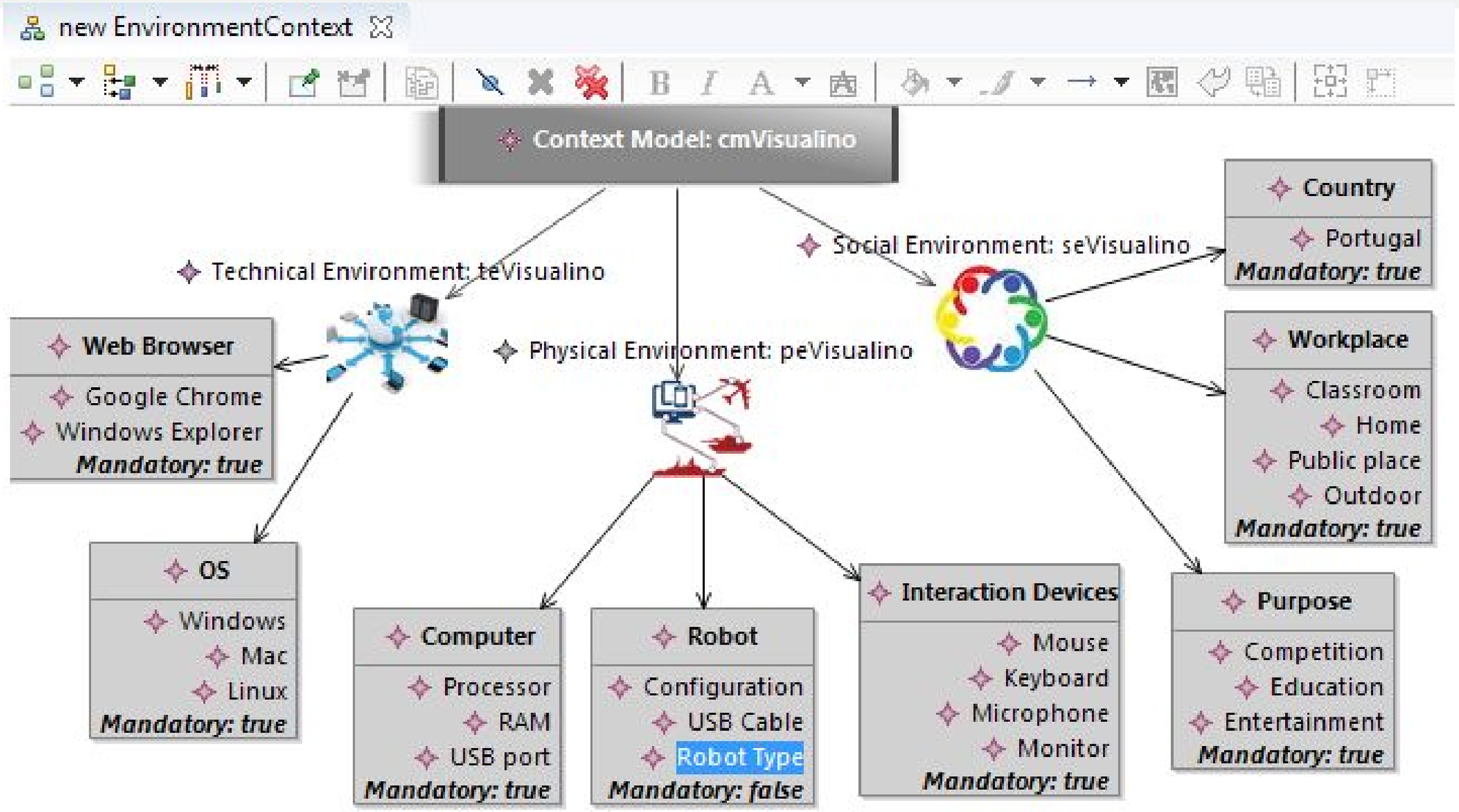
diagram location:
Context Specification -> Context Model

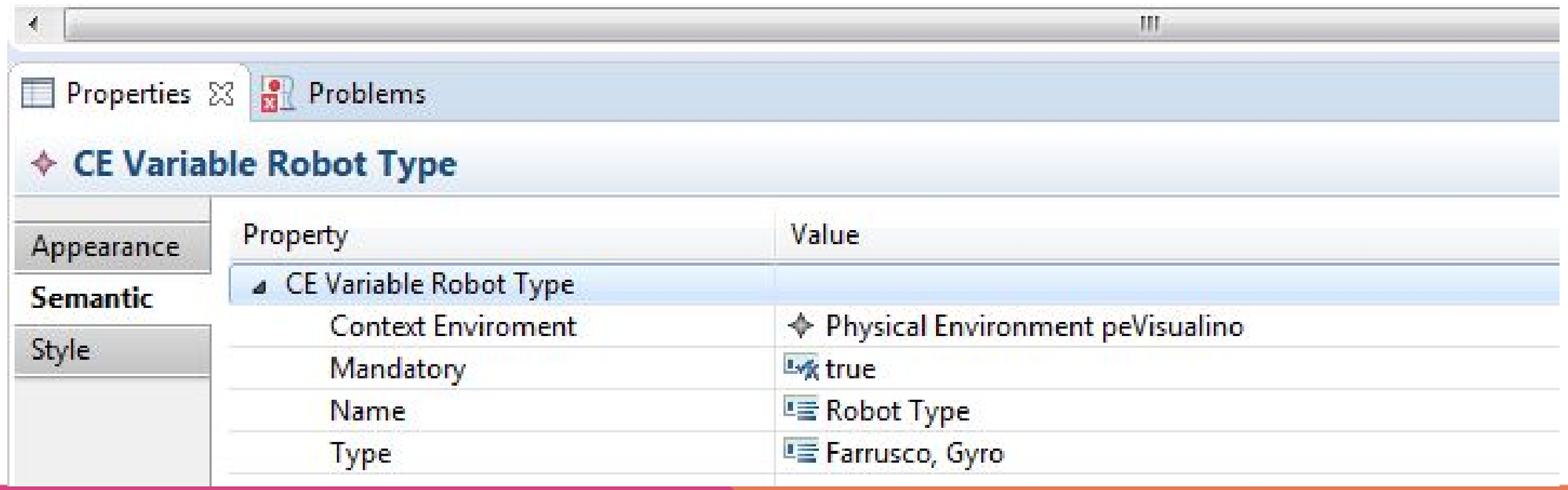


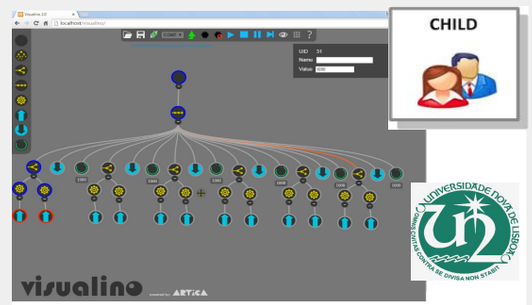


User Templates

diagram location:
Context Specification -> User Profile Specification -> User Profile Child







Environment Context

diagram location:
Context Specification -> Context Model

Workflows

Context Model: cmVisualino

Priority: High
Actor: End User
Secondary Actor: Robot
W1: Program a robot

Priority: Medium
Actor: Domain Expert
W2: Configure language enviroment

Priority: Low
Actor: Language Engineer
W3: Modify language component

uc [Model] Visualino[Workflow1]
Visualino
Program a behavior of robot
Execute a behavior of robot
End User
{Classifier: Age, Priority: High}
Robot

uc [Model] Visualino[Workflow2]
Visualino
Configure language environment
Domain Expert
{Priority: Med}

uc [Model] Visualino[Workflow3]
Visualino
Create new language component
Change or remove existing language component
Language Engineer
{Priority:Low}

Properties | Problems

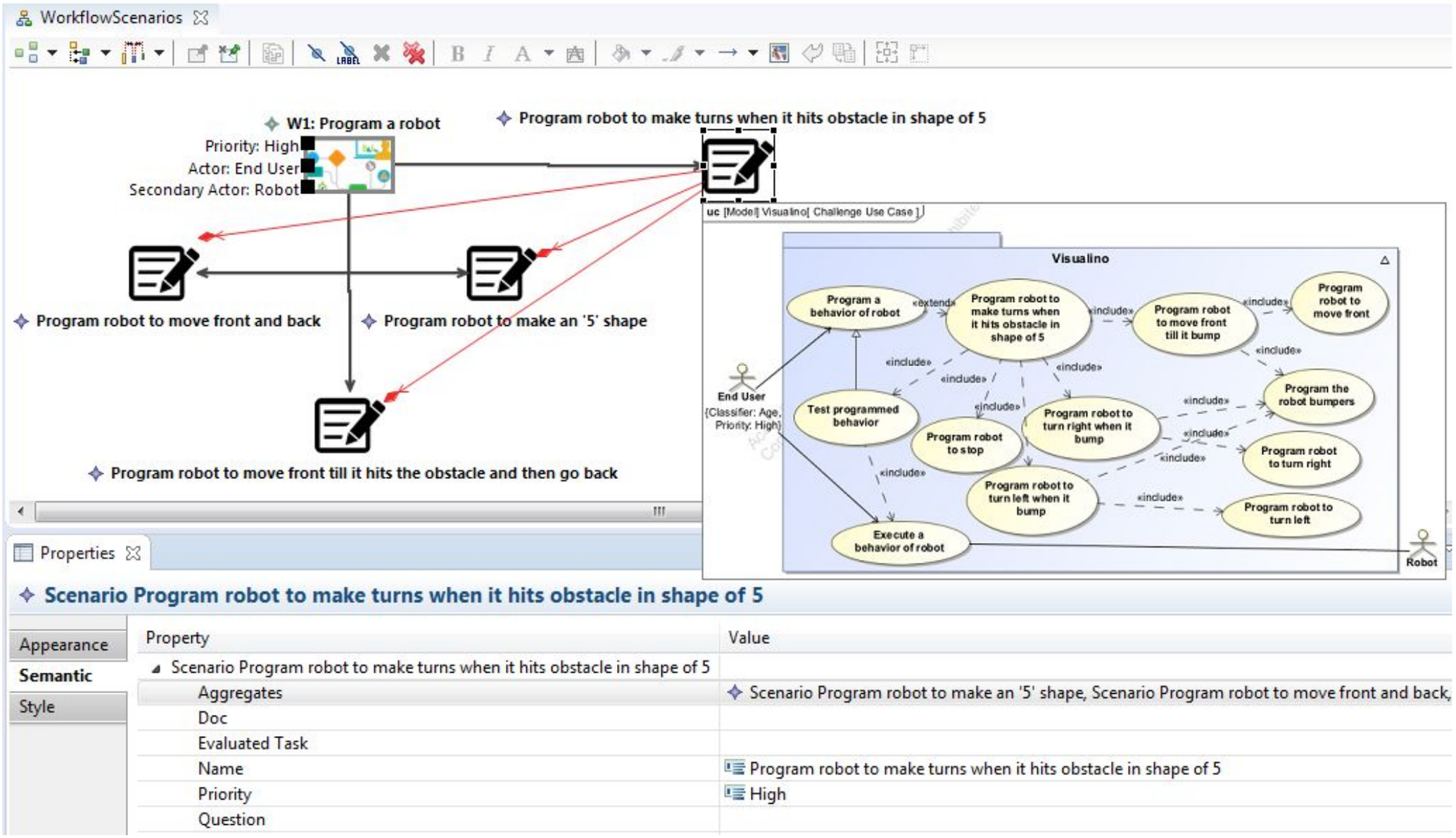
Workflow W1: Program a robot

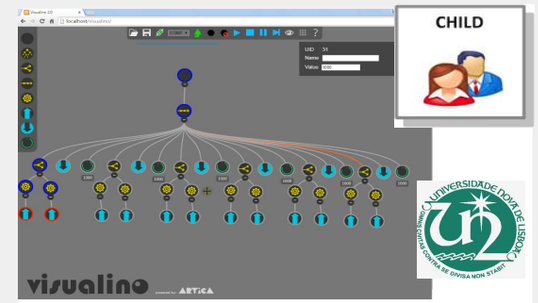
Appearance | **Semantic** | Style

Property	Value
Workflow W1: Program a robot	
Actor	User Profile End User
Context Element	CE Variable Robot
Context Model	Context Model cmVisualino
Name	W1: Program a robot
Priority	High
Process Model	Process Model umlUseCasesVisualino

Workflows

diagram location:
Context Specification -> Context Model

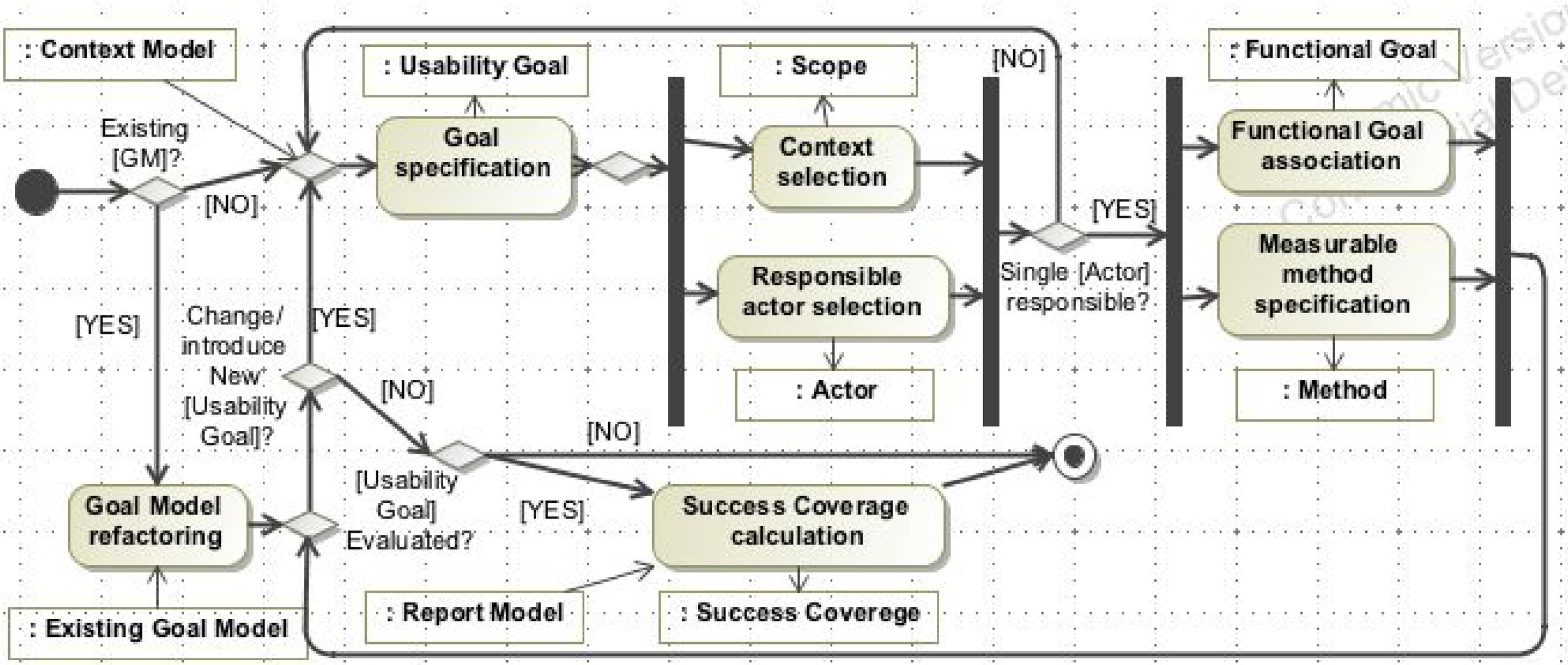


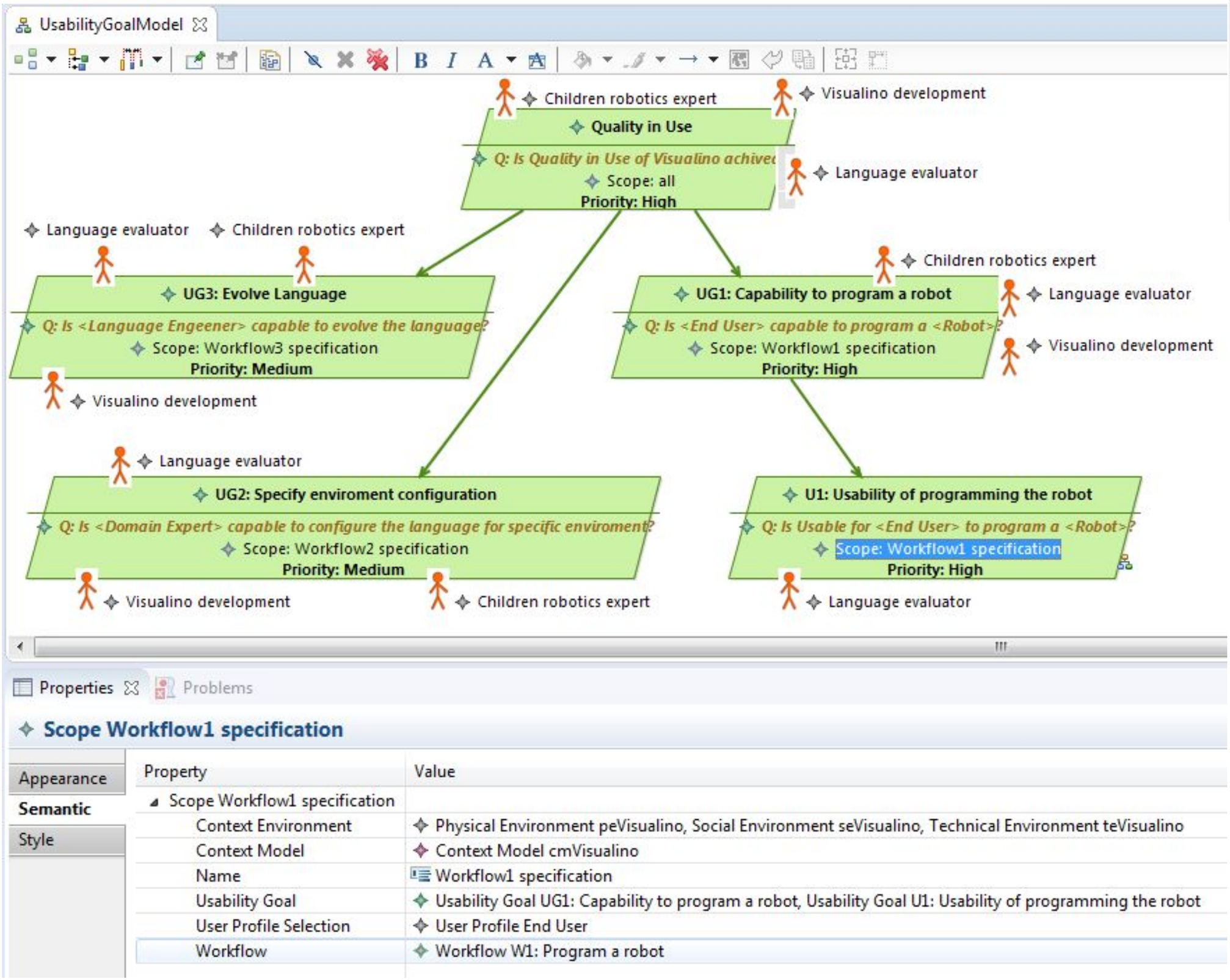


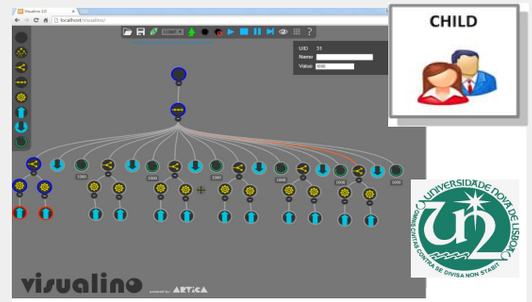
Workflow Scenarios

diagram location:
Context Specification -> Workflow Specification -> Workflow

Goal Modeling (USE-ME)



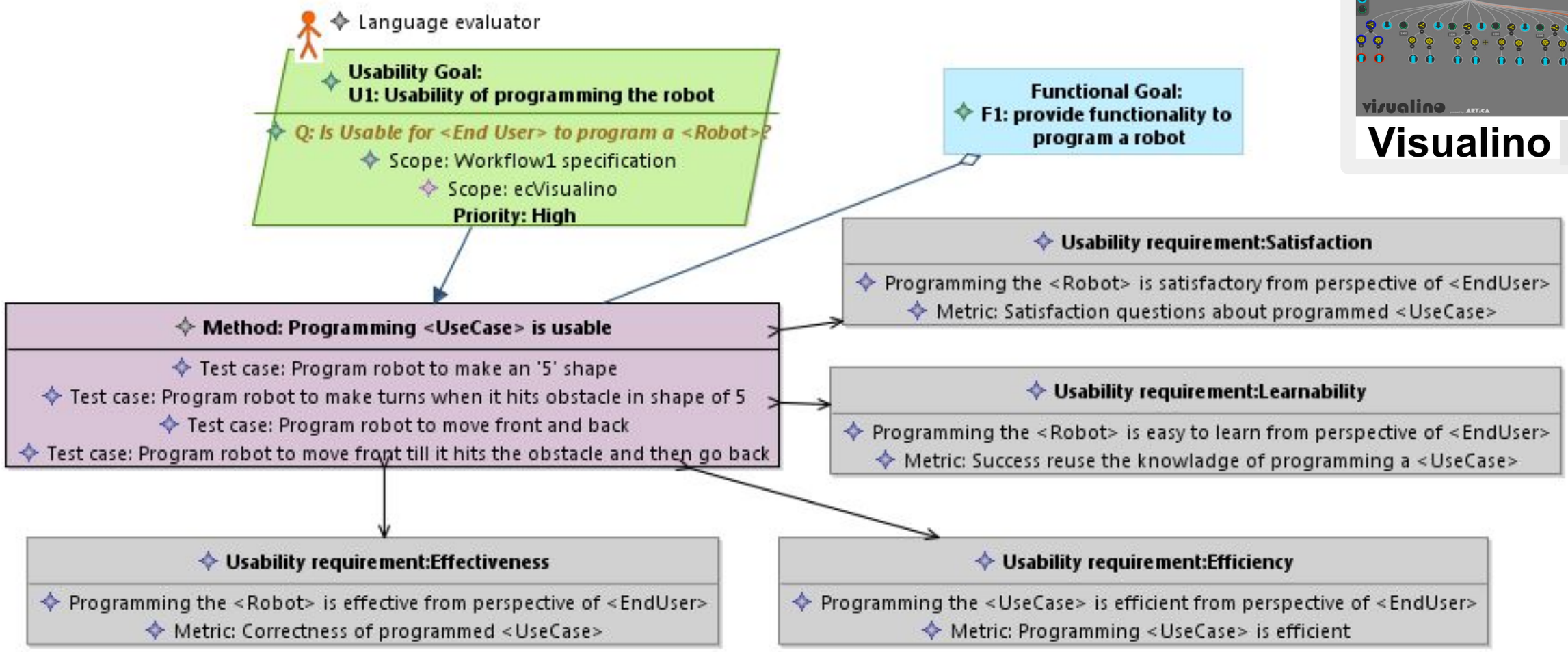




Usability Goal Model

diagram location:

Goal Specification -> Goal Model



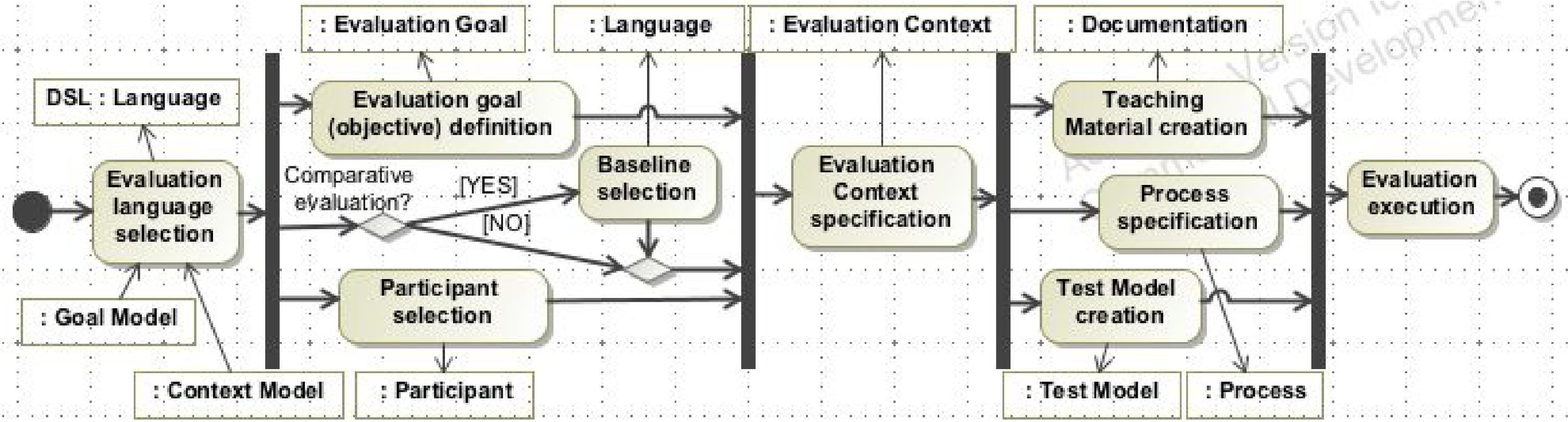
Requirements for Usability Goal

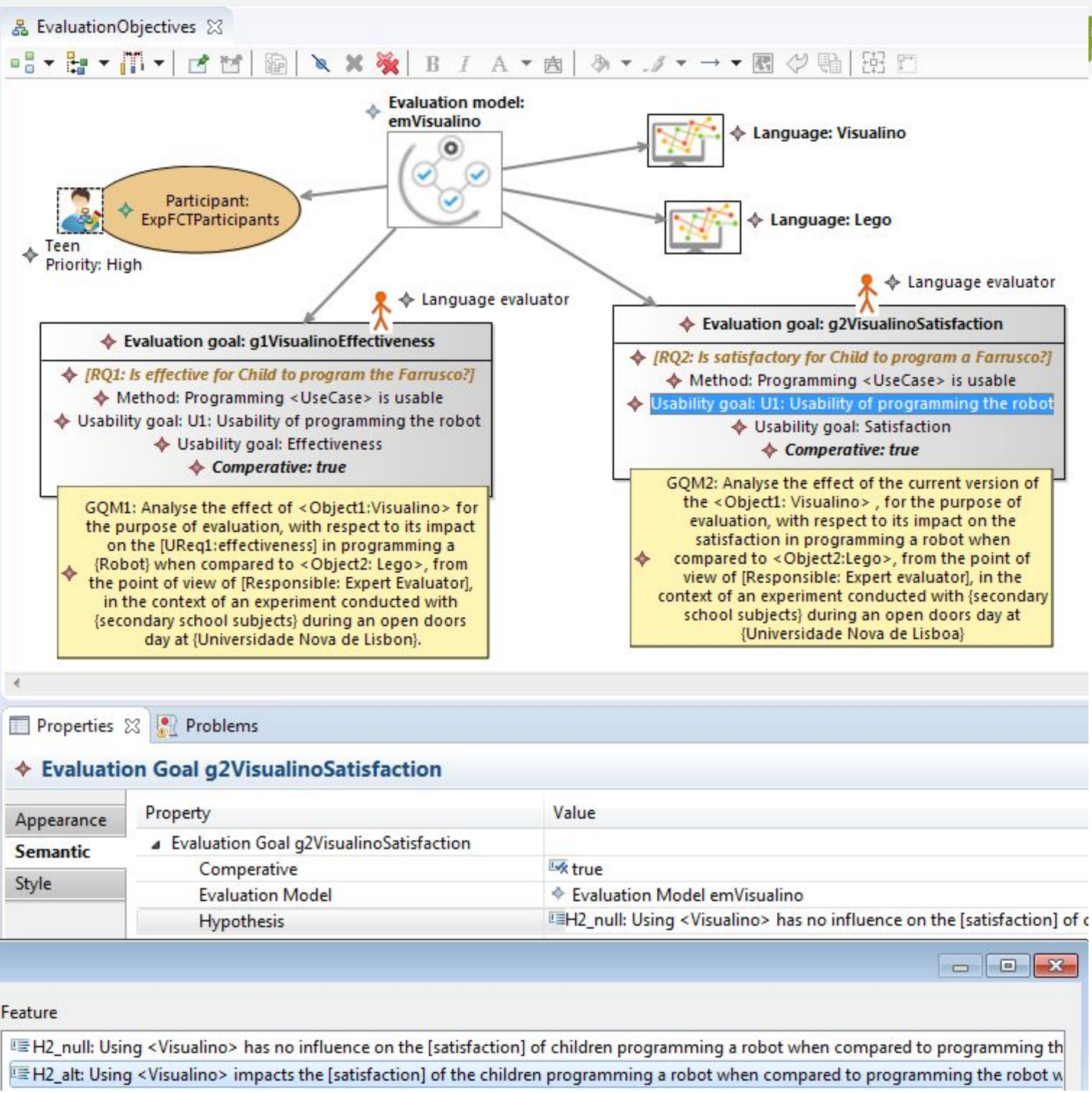
diagram location:

Context Specification

-> Goal Model -> Usability Goal

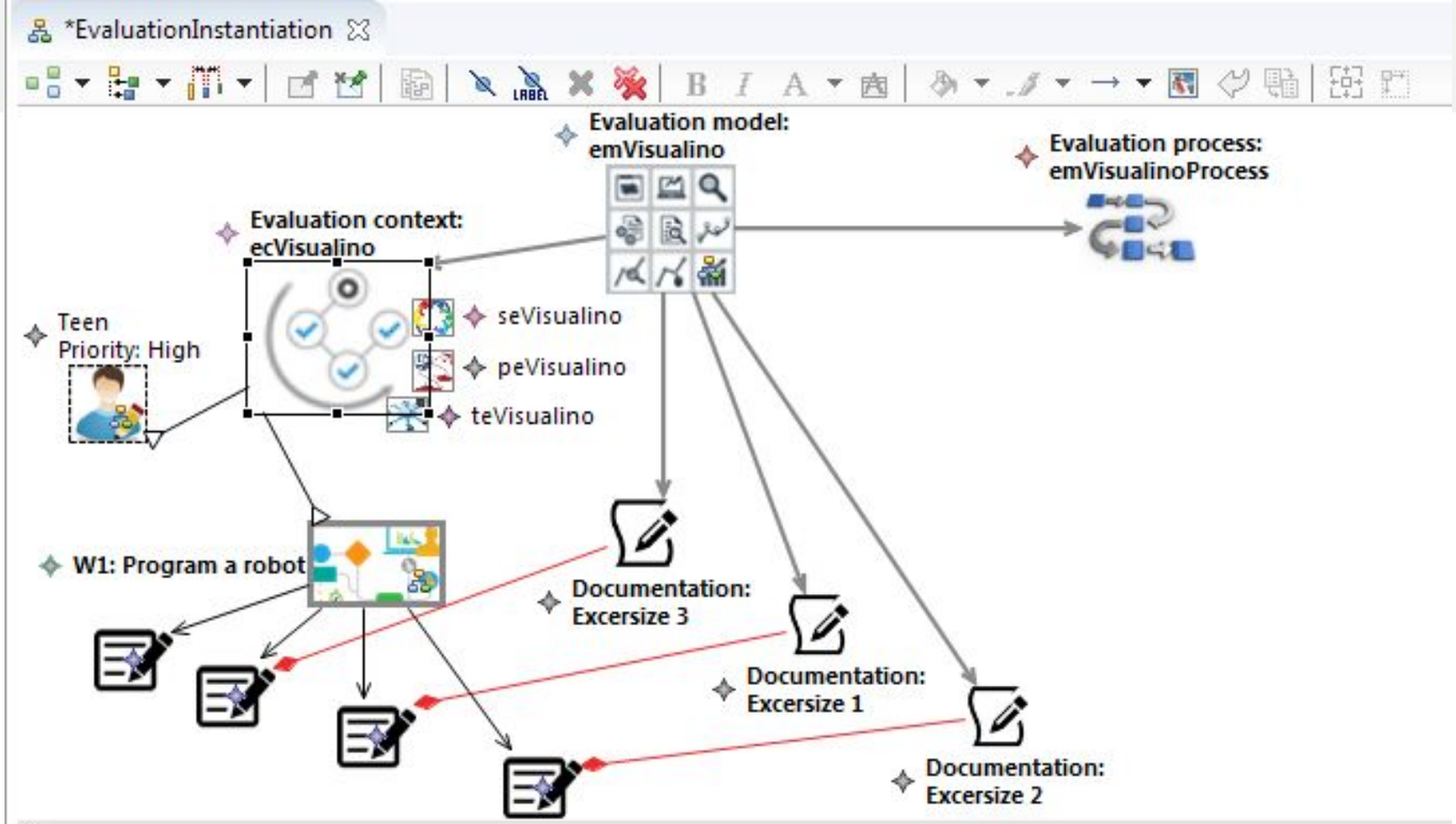
Evaluation Modeling (USE-ME)

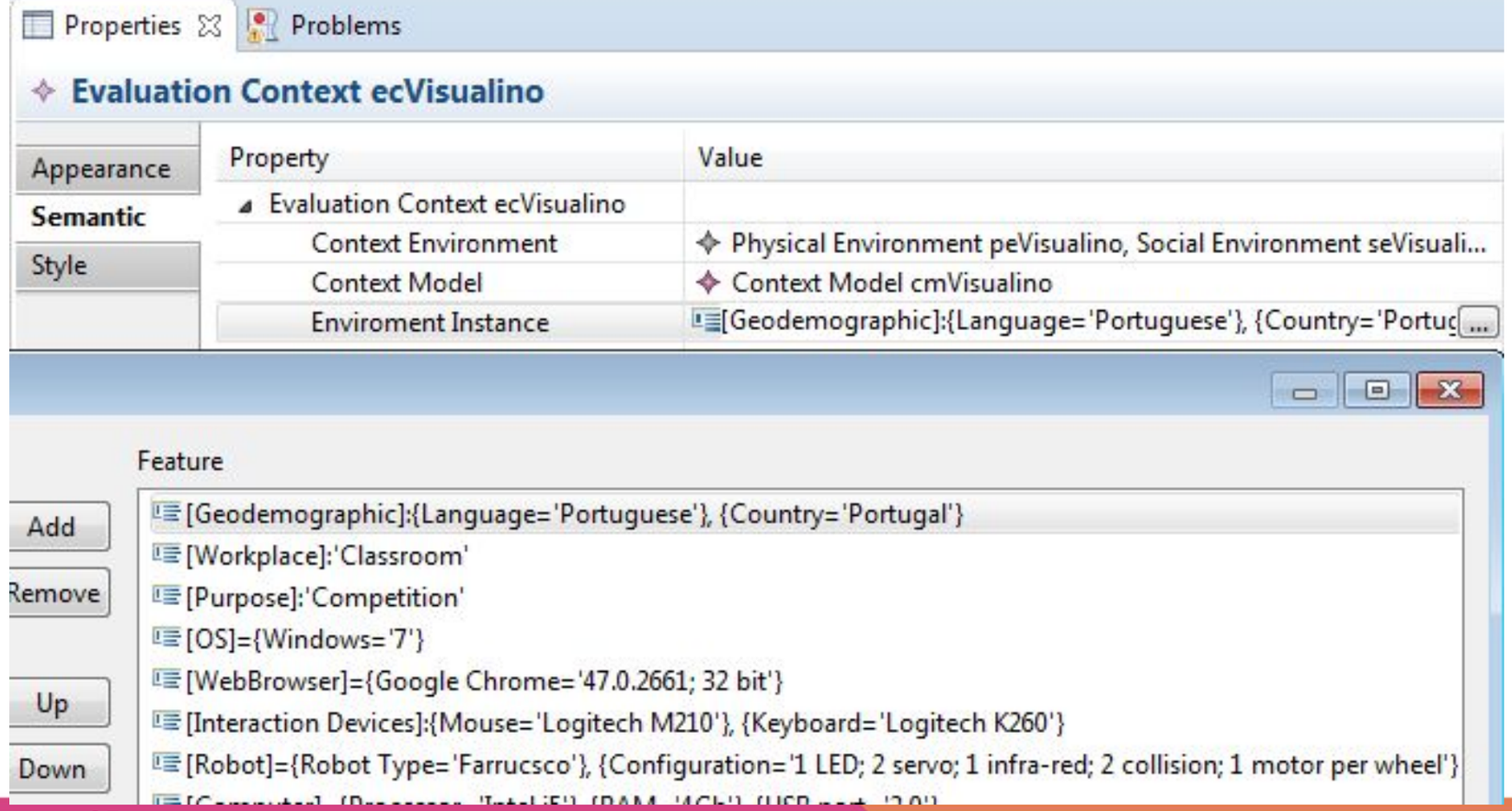


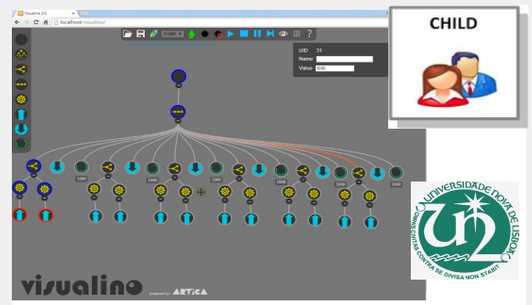


Evaluation Objectives

diagram location:
Evaluation Specification -> Evaluation Model



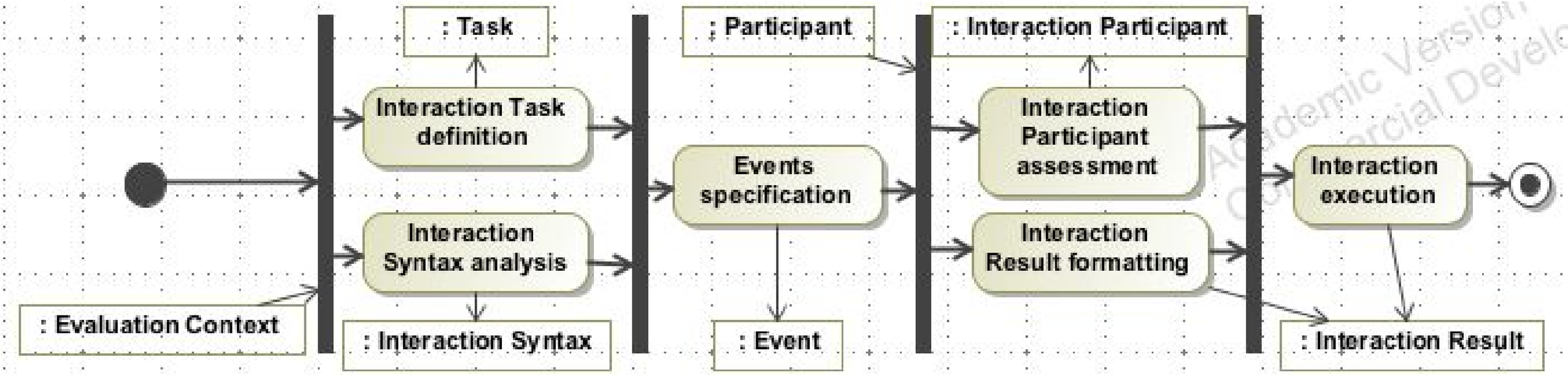




Evaluation Instantiation

diagram location:
Evaluation Specification -> Evaluation Model

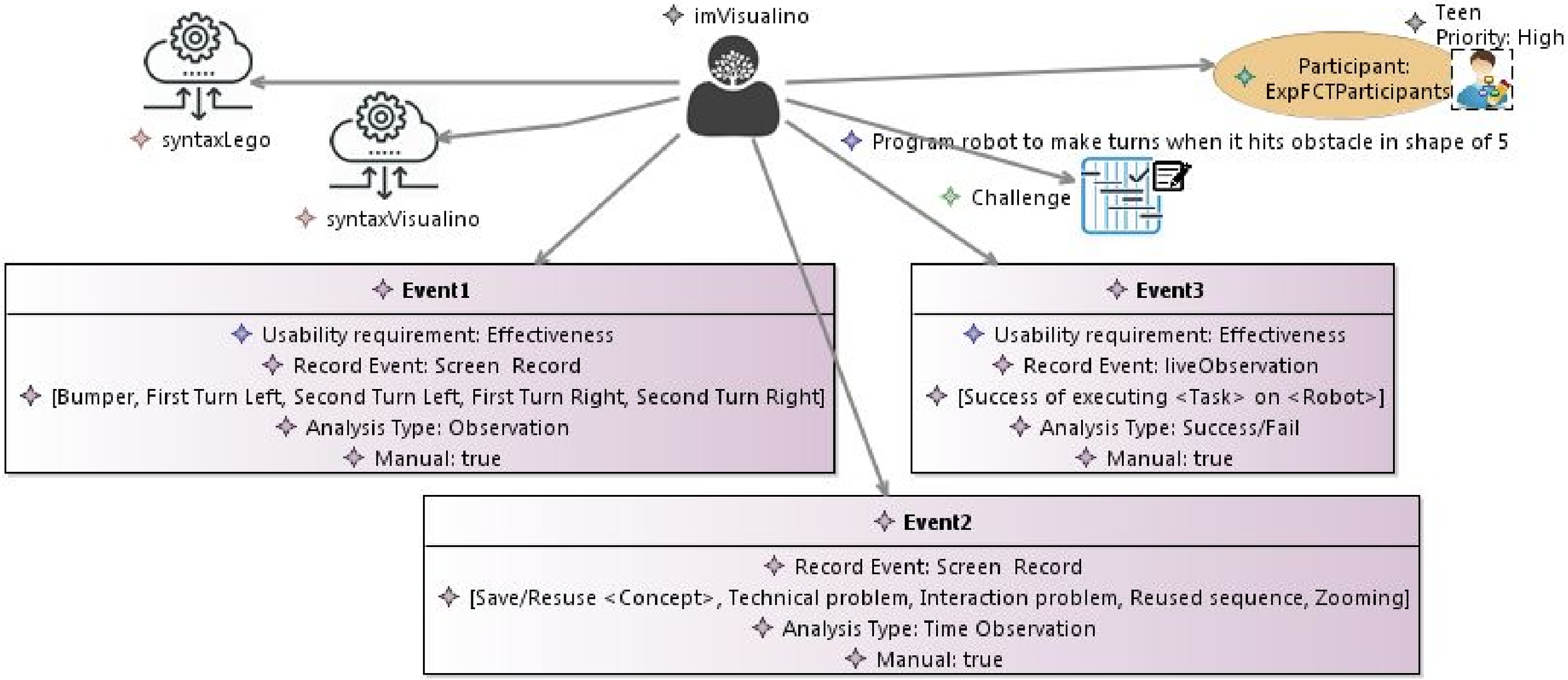
Interaction Modeling (USE-ME)



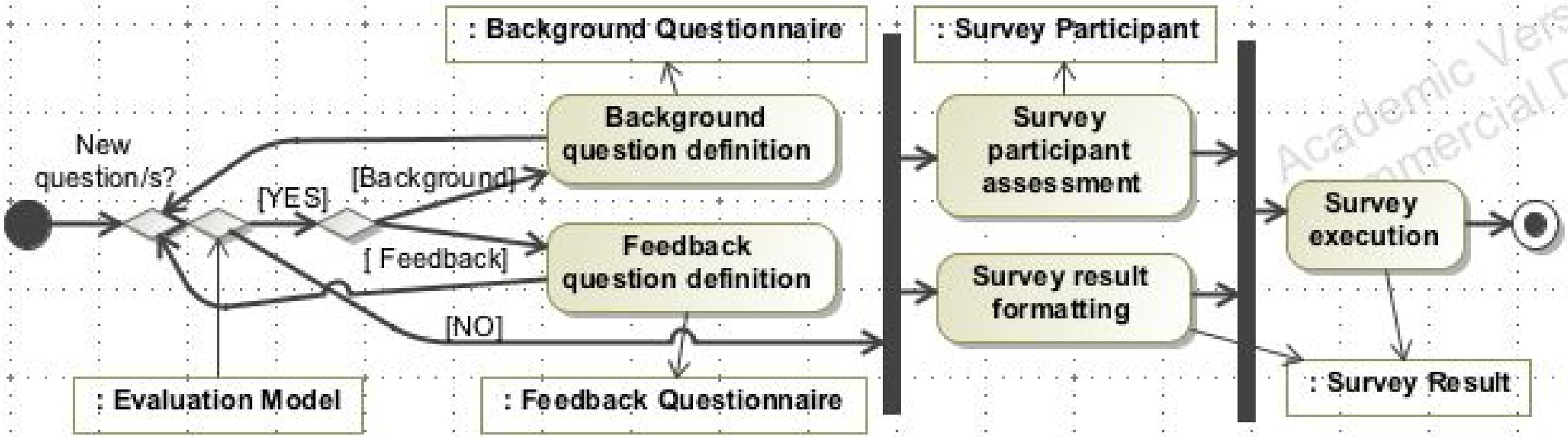
Interaction Test Model

diagram location:

Interaction Specification -> Interaction Model



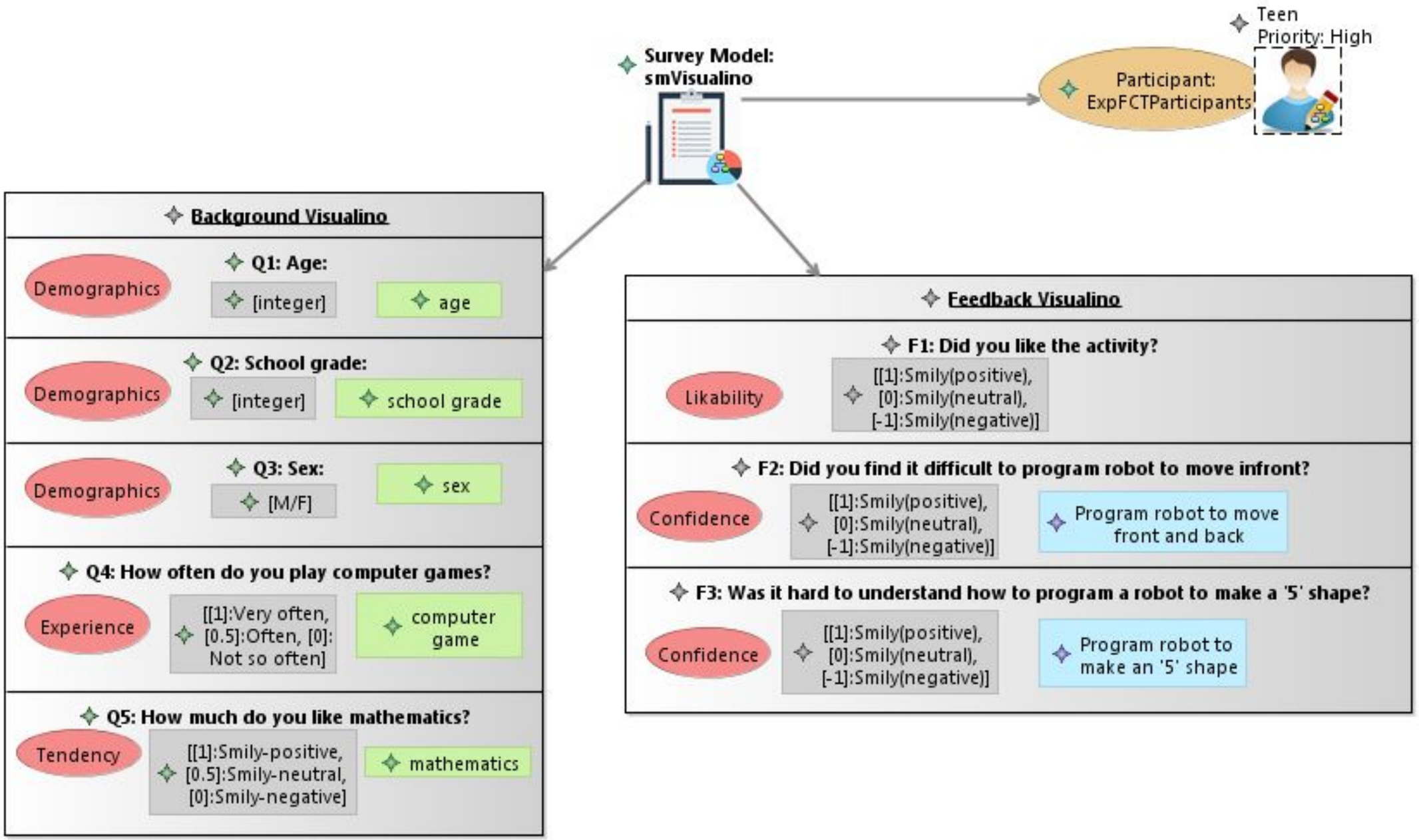
Survey Modeling (USE-ME)



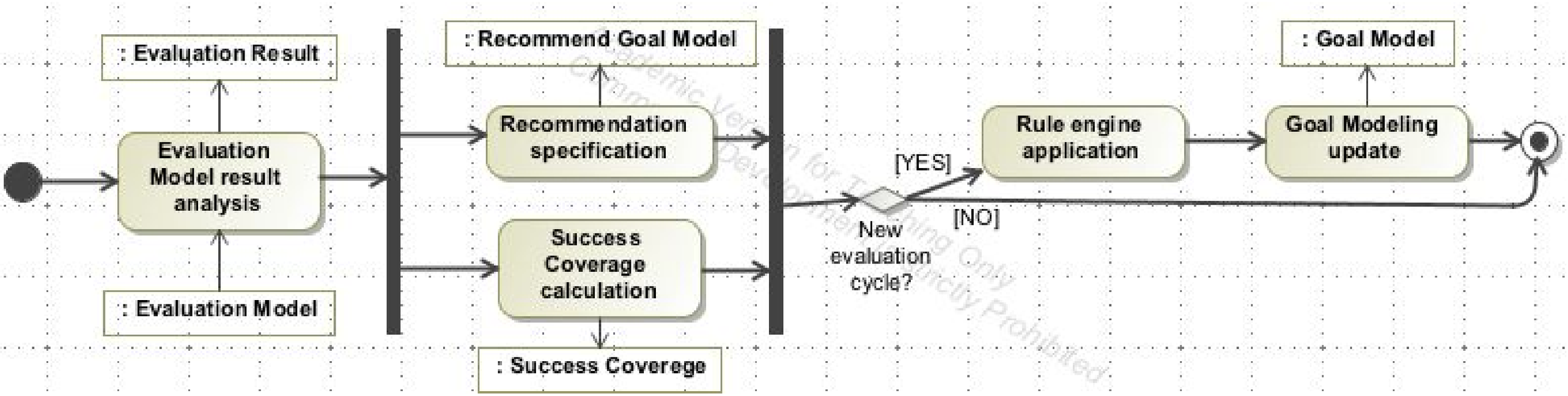
Survey Test Model

diagram location:

Survey Specification -> Survey Model



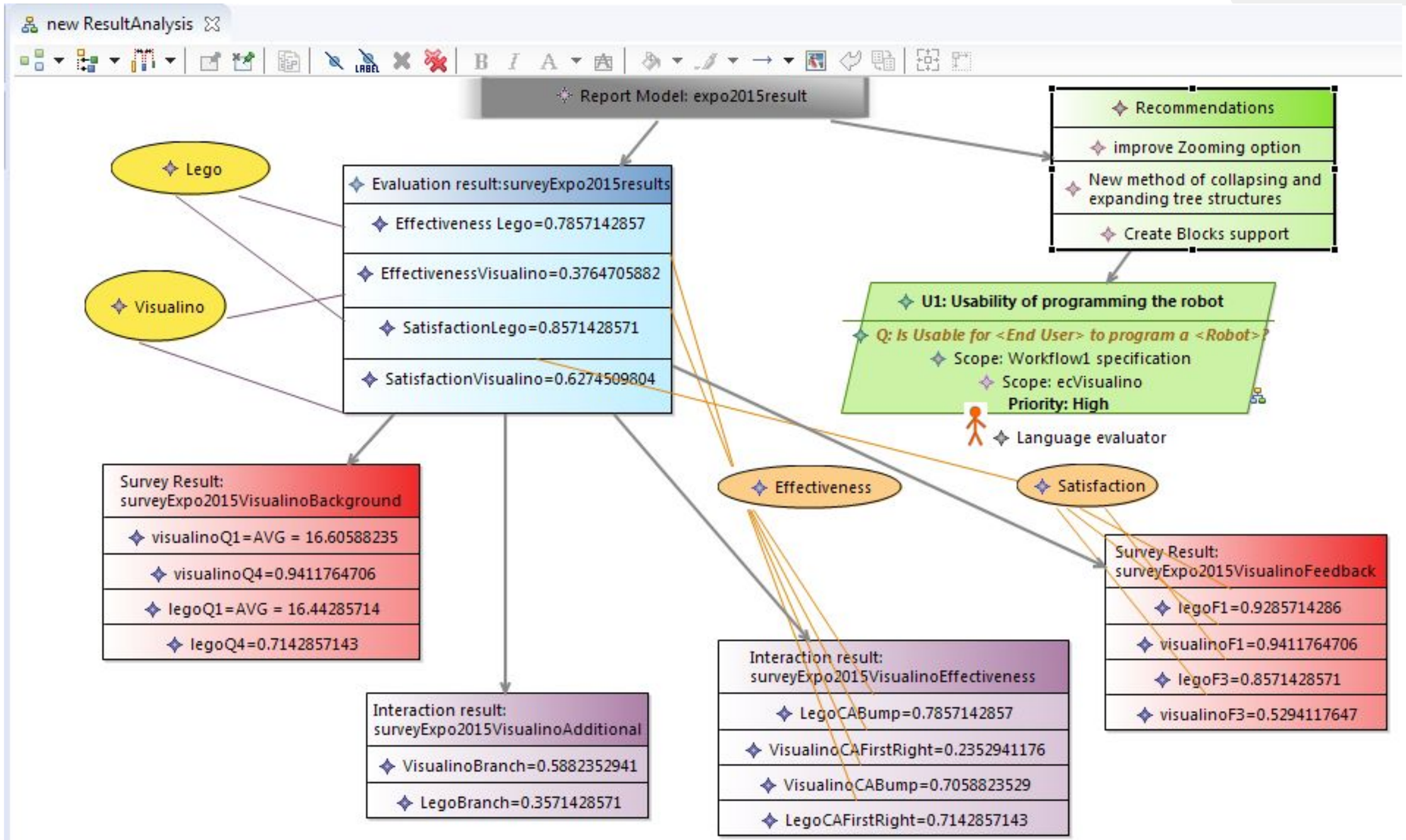
Report Modeling (USE-ME)



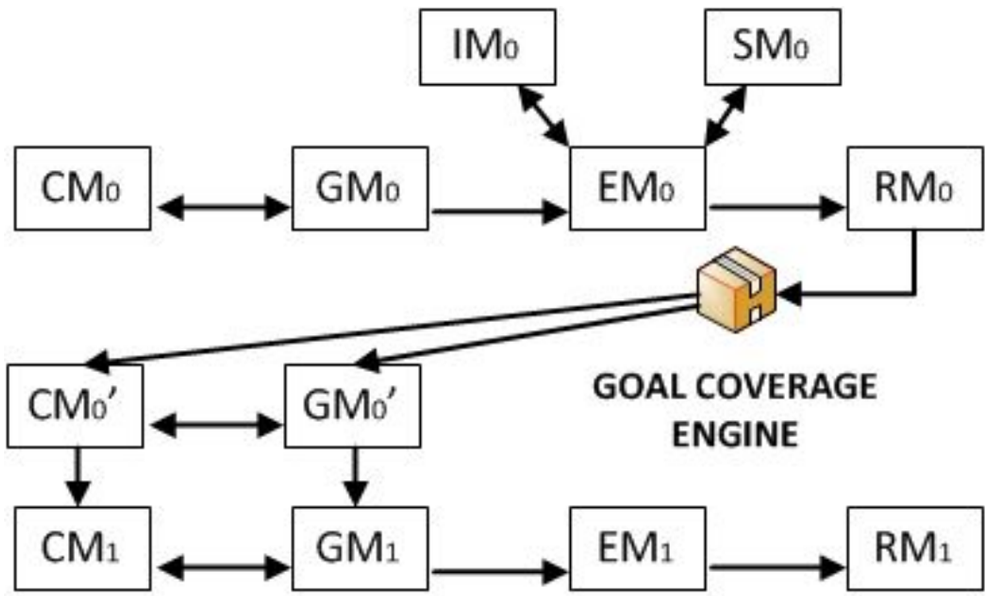
Report Model

diagram location:

Report Specification -> Report Model



Coverage Engine (USE-ME)



CM – Context Model
GM – Goal Model
EM – Experiment Model
RM – Result Model
IM – Interaction Model
SM – Survey Model

Publications

1. Ankica Barišić, Vasco Amaral, Miguel Goulão and Ademar Aguiar: *"**Introducing usability concerns early in the DSL development cycle: FlowSL experience report**"*, InProceedings of the 1st International Workshop on Model-Driven Development Processes and Practices at the 17th International MoDELS Conference, Valencia, Spain, October, 2014
2. Ankica Barišić: *"**Evaluating the Quality in Use of Domain-Specific Languages in an Agile Way**"*, InProceedings of the Doctoral Symposium at the 16th International Conference on Model Driven Engineering Languages and Systems (MoDELS), Miami, Florida, USA, CEUR, October, 2013
3. Ankica Barišić: "**Iterative evaluation of Domain-Specific Languages**", InProceedings of the ACM Student Research Competition at the 16th International Conference on Model Driven Engineering Languages and Systems (MoDELS), Miami, Florida, ACM, October, 2013
4. Ankica Barišić, Pedro Monteiro, Vasco Amaral, Miguel Goulão, Miguel Monteiro: *"**Patterns for Evaluating Usability of Domain-Specific Languages**"*, InProceedings of the 19th Conference on pattern languages of programs (PLoP), SPLASH 2012 Tucson, Arizona, USA, October 2012
5. Bruno Barroca, Eduardo Marques, Valter Balegas, Vasco Amaral and Ankica Barišić: *"**The RPG DSL: a case study of language engineering using MDD for Generating RPG Games for Mobile Phones**"* InProceedings of the 12th Workshop on Domain-Specific Modeling at SPLASH 2012, Tucson, Arizona, ACM, October 2012
6. Ankica Barišić, Vasco Amaral and Miguel Goulão: *"**Usability Evaluation of Domain-Specific Languages**"*, InProceedings of the SEDES Doctoral Symposium at the 8th International Conference on the Quality of Information and Communications Technology (QUATIC), Lisbon, Portugal, IEEE, September 2012,
7. Ankica Barišić, Vasco Amaral, Miguel Goulão and Bruno Barroca: *"**Evaluating the Usability of Domain-Specific Language**"*, InBook: Formal and Practical Aspects of Domain-Specific Languages: Recent Developments, edited by Marjan Mernik, IGI Global, September 2012, pages: 386-407
8. Ankica Barišić, Vasco Amaral, Miguel Goulão and Bruno Barroca: *"**Quality in Use of Domain-Specific Language: a Case Study**"*, InProceedings of the Workshop on Evaluation and Usability of Programming Languages and Tools (PLATEAU 2011) at SPLASH 2011, Portland, Oregon, USA, ACM, October 2011
9. Ankica Barišić, Vasco Amaral, Miguel Goulão and Bruno Barroca: *"**Quality in Use of DSLs: Current Evaluation Methods**"*, InProceedings of the INFORUM'2011, Coimbra, Portugal, September, 2011
10. Ankica Barišić, Vasco Amaral, Miguel Goulão and Bruno Barroca: *"**How to reach a usable DSL? Moving toward a Systematic Evaluation**"*, InProceedings of the 5th International Workshop on Multi-Paradigm Modeling (MPM'2011) at Models 2011, Wellington, New Zealand, EASST Journal, October,2011

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