Towards the identification and formalization of LMS instructional design languages

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Research context
- **Research Objective:** help the teacher/trainer and his community to design and operationalize learning situations.
- **Research topics:**
- Technology Enhanced Learning (TEL) Engineering
- Learning Management System (LMS)
- Instructional Design
- Operationalization

Constats
- Many standards, approaches, and tools exist to facilitate the instructional design.
- Nevertheless, these are still at an immature stage although many corresponding Learning Design authoring tools have been developed.
- They are often not compatible with existing LMSs.
- They do not ensure the full operationalization of the produced models.
- Some translations leading to information loss and semantics are still required to exploit the models produced into the targeted LMS.

The LMS-centered approach
- LMSs aren't pedagogically neutral and they embed an implicit language based on the LMS specific paradigm to specify the design of a learning activity.
- Our work aims to define necessary analysis and steps for the identification and the formalization of an LMS instructional design language.
- The process takes into account three different viewpoints: a viewpoint centered on macro-HMI (Human-Machine Interfaces), a functional viewpoint and a micro viewpoint.
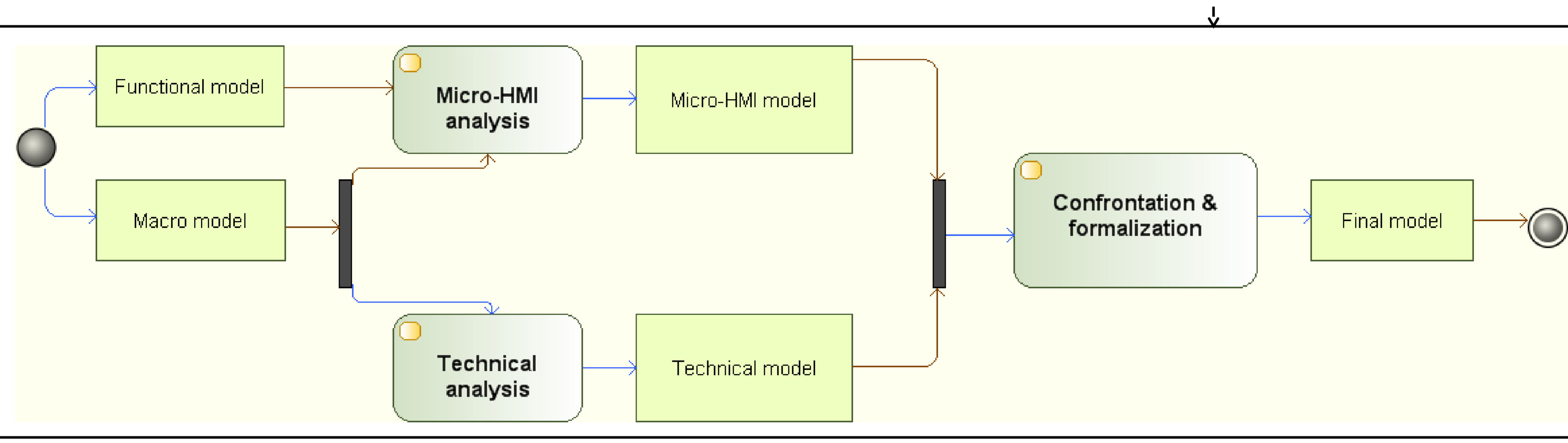
The **macro-HMI analysis** consists of HMIs analysis according to (1) the analysis of existing situations on the platform and (2) the analysis of interfaces related to the specification of new situations.
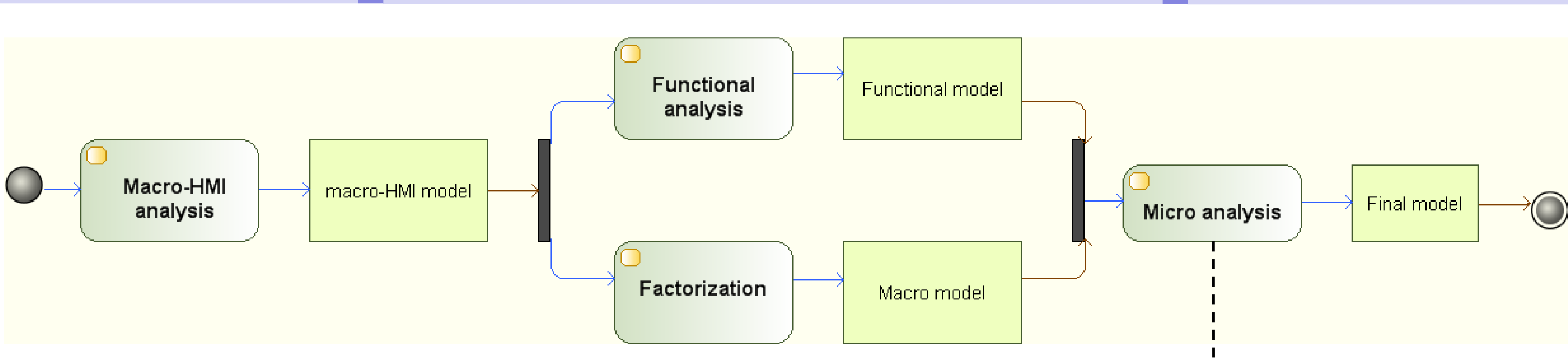
The **functional analysis** focuses on the identification of LMS existing functions.

Factorization is the process of finding common attributes shared between two or more pedagogical elements in the macro-HMI model.

The **micro-HMI analysis** consists in analyzing the concerned interfaces at a finer scale.

The **technical analysis** consists in specifying a reduced Conceptual Data Model of the LMS. The main source of information for identifying the instructional design language is the LMS database.

The confrontation and the formalization step concerns the confrontation of both micro-HMI and technical models, and the formalization of the final model.

Moodle Case study

Macro-HMI analysis

Functional analysis

Factorization

Micro analysis

An extract from Moodle Macro-HMI model

An extract from Moodle Functional model

An extract from Moodle Macro model

Micro analysis

An extract from Moodle Final model