

# **Adaptive E-learning System for Language Learning: Architecture Overview**

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# Outline

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- Introduction
  - computers in language learning
  - computer-based language learning
- Tutoring
  - vs. teaching
  - software
  - intelligent tutoring systems
- Architecture proposition
  - system characteristics
  - roles and implementation of system models and modules
- Conclusion



# Introduction – computers in LL

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- Using computers for language teaching/learning may be designated as
  - (1) computer-enhanced language learning, or
  - (2) computer-based language learning.
- Although similar, a distinction may be drawn between the two terms



# Computer-enhanced language learning

- Using computer software as teaching aide to support and complement day-to-day activities
- Technologies/tools:
  - spell checkers,
  - digital dictionaries or glossaries,
  - wikis,
  - blogs,
  - social networks, etc.
- These help teachers (and students) to carry out language learning activities with increased efficacy and efficiency



# Computer-based language learning

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- Characterised by the use of advanced language learning software (web-based or standalone)
- The software acts independantly in constructing learners' linguistic knowledge and developing language competences and skills
- The computer acts as a **tutor**, role different than that of a **teacher** in the traditional sense



# Tutoring role



TUTOR



TEACHER

- Learning process is adapted to the needs of individual students – **personalisation**
- Tutor's tasks include:
  - monitoring the learner,
  - inferring learner's characteristics,
  - making appropriate on-the-spot adjustments to the teaching process.



# Tutoring software

- Intelligent computer assisted language learning (**ICALL**) field deals with the development of tutoring software and research of its effects on teaching/learning
- Technology able to address tutoring requirements is **intelligent tutoring systems** (ITSs)
  - represent a micro-adaptive approach to adaptivity;
  - evaluate learner actions during the entire course of learning;
  - keep an up-to-date learner model of relevant learner characteristics;
  - make informed decisions on how learning is adapted to learners' needs;
  - traditionally consist of 4 models: **domain** model, **learner** model, **instructional** model and **interface** model.



# Language tutoring systems in use

- Often developed for commercial purposes
  - costs,
  - complexity of design, implementation and maintenance,
  - multidisciplinary context.
- Relevant literature reveals a number of systems developed for research purposes
- Systems differ in adaptation methods employed
  - individualised feedback (TAGARELLA, E-Tutor);
  - transforming learning content (AL-TESEL-e-learning system, UoLmP);
  - adjusting the sequence of learning activities (VocabTutor, PIMS).





# Language tutoring systems – issues

- Existing systems exhibit certain issues
  - horizontal restriction,
  - vertical restriction, and
  - overt focus on curriculum.
- The emphasis today is on the **integrative approach** to language teaching and learning, bringing together language skills, general and language strategies, and linguistic knowledge for the purpose of enabling communication

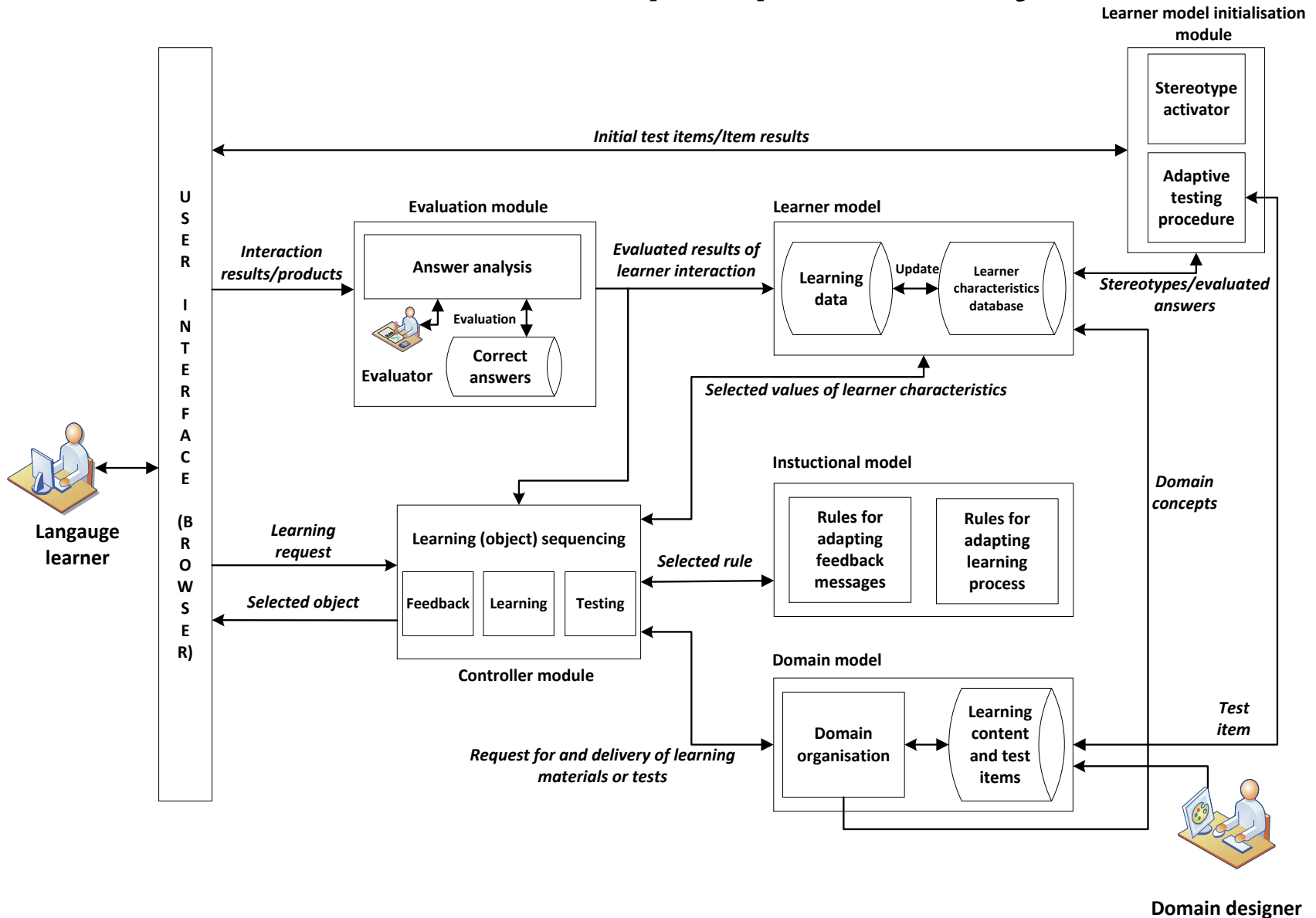


# Adaptive e-learning system - overview

- Main characteristics of the system:
  - adaptive,
  - web-based,
  - enriched traditional ITS structure,
  - teaching/learning English,
  - for learners with different level od language competence,
  - under development.
- The system has a twofold purpose:
  - (1) identification of the level of a learner's language competence, and
  - (2) systematic learning support through guidance (based on CEFR competence level of learners)

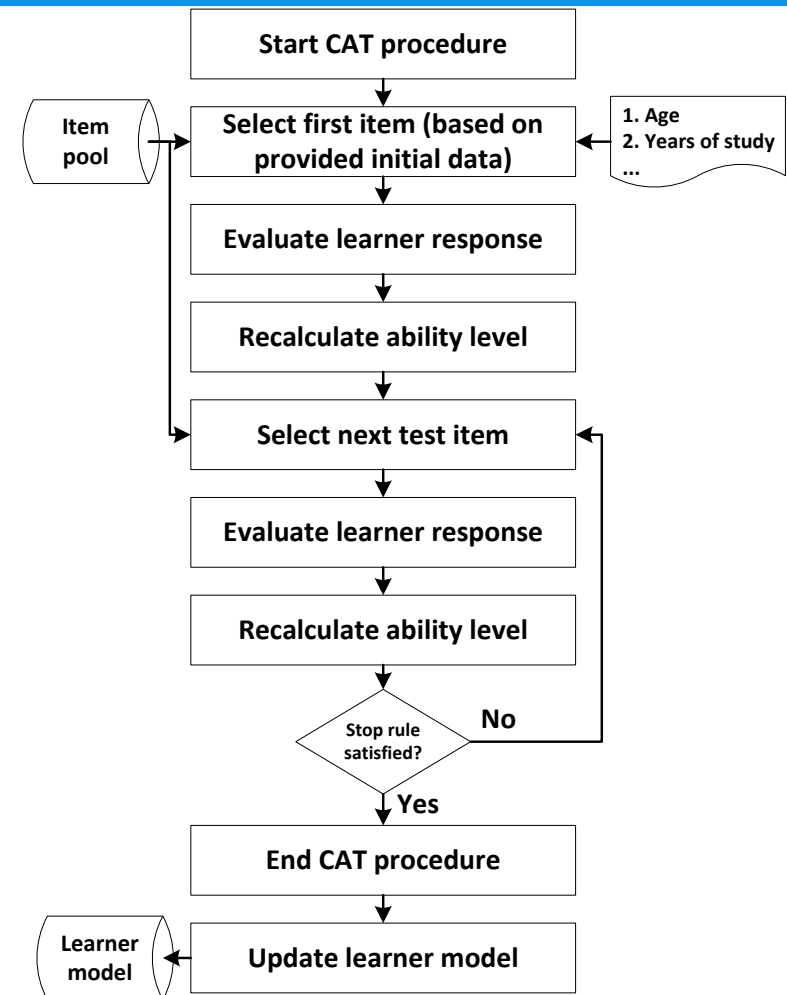


# Architecture of the proposed system



# Proposed system components 2/4

- **Learner model initialization** module
  - deals with the initial lack of knowledge about the learner;
  - adaptive computerised test with Item Response Theory as the basis.



# Proposed system components 1/4

- **Domain** model
  - implementation in two parts: (1) domain organisation part, and (2) a database containing all learning materials;
  - designed based on the Common European Framework of Reference for Languages (**CEFR**), for each skill separately;
  - enables highly granular monitoring of learner progress;
  - focus shifted from achievement to proficiency.
- **Learner** model
  - represented by an up-to-date database of each learner's characteristics and domain coverage by the same learner – a version of the well-known **overlay model**;
  - initialisation problem solved by implementing an adaptive testing procedure.



# Proposed system components 3/4

- **Instructional** model
  - central point of the system and the educational process;
  - defines the logic of system behaviour;
  - implemented as a repository of heuristic rules concerning tutoring/teaching;
  - rules are activated according to the values stored in the learner model.
- **Controller** module
  - coordinates the work of the entire adaptive system;
  - responsible for checking values stored in the learner model, selecting rules and applying them during the learning process;
  - also able to deal with possible learner requests for learning.



# Proposed system components 4/4

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- **Evaluation** module
  - evaluates the accuracy of learner activities;
  - proscribes how learner activity will be mapped onto the learner model (i.e., how it is updated).
- **Interface** model
  - communication point between the learner and the system;
  - access using a web-browser;
  - client-side technologies (AJAX) in implementation.



# Conclusion & future work

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- Architecture overview of an adaptive e-learning system for language learning
  - enriched traditional ITS architecture
- System addresses issues detected in other adaptive language-learning systems in use
- Aims to detect the CEFR competence level of learners and guide them towards higher levels of proficiency
- Future work
  - completion of the system,
  - testing the system with learners.





# Questions

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Thank you for your attention.

