A mobile and Adaptive Language Learning Environment based on Linked Data

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The MAPLE project

- **Mobile, Adaptive & Personalized Learning Experience**
- A cooperation between
  - 5 industrial partners: Belgacom, Streamovations, BLCC, Televic Education and RMM
  - 4 IBBT research groups: ITEC@K.U.Leuven, CUO@K.U.Leuven, SMIT@VUB and MMLAB@UGENT

- **Main Goal**
  - To develop a web based e-learning environment that is able to provide rich, personalized experiences to a wide range of devices

Context: language learning
The platform

NinSuna platform

- Media ingest service
- Media store
- Selection & packaging
- Media delivery channels
- Adaptation decision taking engine

MAPLE e-learning platform

- RDF database:
  - learner profiles
  - exercise content + metadata
- Decision component
- Learning endpoint
The platform

NinSuna platform

Media ingest service -> Media store -> Selection & packaging -> Media delivery channels

Adaptation decision taking engine

RDF database:
- learner profiles
- exercise content + metadata

Decision component -> Learning endpoint

MAPLE e-learning platform
Data models

- The following models have been used
  - Learning items
    - Model for the content
    - Model for the metadata
  - Learner profile
    - Learner characteristics
    - Logging
  - Learning domain
  - Media resources
The items: content + metadata

- **Examples of items:**
  - Exercises
    - multiple choice, translate, click in zone, …
  - Related items
  - Theory
  - Navigation items

- **We modeled**
  - The metadata of the items
    - LLOM+ = Language Learning Object Metadata+
      - based on IEEE standard LOM
  - The content of the items
    - MAPLE Content ontology
Content + metadata of items: example
The logging

- Part of the learner profile […]
- Sessions
  - Learner session
  - ItemObjectSession
  - …
- Events
  - AnswerSubmittedEvent
  - ButtonClickedEvent
  - CheckboxCheckedEvent
  - EvaluationEvent
  - …
Links within the data

- Media metadata
- Item content
- Item metadata
- Domain model
- Logging
- Learner profile

Links:
- Media metadata includes media
- Item content contains answers, items answered
- Item metadata includes learning subject
- Domain model contains proficiency levels
- Logging contains learner profile
The decision component

- Item-based
- Adaptive
  - Automated sequencing
    - tuned difficulty
    - preferred exercise types
  - Learner control
    - learning subject selection (by the learning subject tree)
    - navigation items

- Observation and measurement
  - State-of-the-art proficiency scores updating algorithm
The architecture of the decision component
Conclusion

- Adaptive exercise based learning environment
  - Decision component
    - Automated sequencing
    - Learning control
  - Integration with Ninsuna Media Delivery Platform
    - Adaptation to the mobile device

→ adaptive e-learning system working on a large set of mobile devices
Some screenshots
Future work

- Validation of the platform
- Extending decision component functionality
- Enriching the data models
- Exploiting possibilities of the Semantic Web by linking learning items to the Linked Open Data cloud.
Thank you!