

# User-centered design methods for validating a Recommendations Model to enrich Learning Management Systems with adaptive navigation support

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This paper presents

the formal **user-centred methodology**  
defined in conjunction with experts in  
**HCI and Psychology**  
to understand the users needs  
and  
validate/refine the recs. model

## Introduction to the approach

- Recommendation techniques have shown to be successful in many domains
  - movies, books, music, etc.
- Can they be useful in eLearning?
  - Proposal:
    - deploy a RS to extend the functionality of LMS with ANS
  - Contributions:
    - model of the recommendation process from informal discussions with lecturers and reqs. gather from projects
    - a standard-based recs. service that implements the model
    - RS prototype integrated in dotLRN LMS
    - formative evaluation process with small-scale studies

# RS in dotLRN LMS as a new portlet

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## Recommendations

Hello Olga. If you don't know where to go, here you have some suggestions:

-  Would you like to see what the system knows about you? 
-  Do you want to learn more on how to suit needs of students who need alternatives to visual contents? 

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# RS in the eLearning domain

- Goals → Criteria for validation: 
  - Improve learning **effectiveness** and **efficiency** in using the LMS
  - Reduce the learners' **drop-out rate**
  - Reduce the teachers' **workload** related to the follow-up and support of the learners
  - Improve users' **satisfaction** (teachers and learners)
- How? → Navigation adaptation
  - Suggest the most appropriate actions to take: links to objects in the LMS (instructions and explanations)
  - Input
    - user profile: dynamically built from the users' interactions
    - current context: course, objective, platform tool, ...
  - Output generation:
    - First phase:
      - Recs. obtained from teachers following the proposed methodology
    - Second phase:
      - feed recs. algorithm to tune the recs and/or produce new ones

## So what?

- Find-outs:
  - when trying to define recs using the model
    - we lack the content and context to think about meaningful recs that **address the real needs of learners in eLearning scenarios**
  - users had been involved to gather requirements in several projects (aLFanet, ALPE, EU4ALL)
    - insufficient to understand their needs for this particular issue
- On going works are to:
  - Validate/refine the **model** with a scenario-based user-centered design process
  - Obtain **samples** of meaningful psycho-educational sound recs. from current teaching practices

## Scenario-based user-centred design approach

- Scenario-based methods involve users in writing **stories** about the problems taking place in relevant situations that come to their mind
  - based on these scenarios, the design team propose solutions
  - By Mary Beth Rosson and John M. Carroll
- Users involved in our study → **teachers** 
  - RS address the needs of the learners in LMS but
  - the goal is NOT to satisfy the learners' preferences
    - psycho-educational considerations
- The outcomes of this study (i.e. recs. elicited)
  - be checked with **learners**
    - assure that they are useful to reach the desired goal


## Stage 1: Briefing and initial data gathering on the participants' background

- **Introductory face-to-face session:**
  - Explain:
    - aims and objectives of the research
    - nature of the participation expected
    - benefits for potential participants
  - Present sample scenarios to wake up their mind
  - Hand in a consent form to take home to read before signing
    - conditions and requests
- **After the face-to-face session**
  - participants are given time to digest the information
- **If they agree to participate:**
  - fill in an online questionnaire
    - demographic information and teaching experience
  - sign the consent form and give it back in the next F2F session

## Stage 2: Eliciting scenarios with the participants

- Individual face-to-face semi-structured interviews
  - arranged with the research team to build together a couple of scenarios
    - reflect the teacher's experiences
  - audio recorded for further analysis
- Interview conducted by
  - a primary researcher (script)
    - poses the questions → follows the participant reasoning
  - a secondary researcher (template)
    - taking notes → checks relevant information to identify the recommendations is provided

## Stage 3: Identifying the recommendations in the scenarios by the research team


- From the scenarios built in the interviews
  - research team:
    - identifies recs 
      - So far: different types of recommendations have been elicited
        - » all look relevant for the eLearning domain
        - » participants properly selected (different background)
    - attempts to map them onto the recommendations model
      - if the information required to describe the recommendation does not map to the model → revise the model
      - process done by 3 members of the research team
        - » and then checked for consistency
- Expected result:
  - enriched situation scenario
    - includes recommendations that address the problems and situations identified by the teachers in the interviews

## Stage 4: Review of the scenarios and the recommendations elicited

- **First step → participants individually**
  - analyse individually the enriched scenarios proposed by the researcher
    - which include the recs identified by the research team
  - are asked to:
    - state the relevance of each recommendation using a five point Likert scale
    - propose new recommendations (or modifications to the existing ones) within the situation described in the scenario
- **Second step → participants collaboratively**
  - after the individual revision by the participants
    - the research team aggregates scenarios that share similar situations and present a new (and reduced in number) set of enriched scenarios
  - A focus group is planned to validate the results obtained → discuss the set of enriched combined scenarios
    - teachers who have built the scenarios
    - considering involving other roles:
      - experts in the online teaching practices
      - learners



## After the process

- Research team revise the model and ask the developer team for modifications (if needed)
- (Revised) RS is presented to participants:
  - model
  - prototype integrated in dotLRN
- Teachers are asked if interested in applying the RS to one of their courses
  - To validate in real settings the utility of RS 
  - If agree, a new F2F session arranged to prepare the recs for the course and plan the experiment

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**Any suggestions?**

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