

OTEC (Educational Technology Expertise Centre)

+

Knowledge dating in Learning Networks



Peter van Rosmalen  
Heerlen, June 13th, 2006

**OpenUniversiteitNederland**

# Overview

- OTEC
- TENCompetence
- Current work: ASA

# Open Universiteit Nederland

## Distance Learning University:

- Law, Management, Natural Sciences, Informatics, Cultural studies, Psychology, Education (full degrees and modular courses)

## Three missions:

- To create an effective, attractive, accessible and cost-effective form of higher education
- To innovate higher education,.
- To reduce the teacher shortage in Dutch

# Educational Technology Expertise Centre

- Research programme: instructional design
- Technology development programme: learning technologies
- Implementation programme: support and innovation
- Educational programme: MSc Active Learning

# Research Programme

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# INSTRUCTIONAL DESIGN FOR OPEN TASKS, ENVIRONMENTS, AND COMMUNITIES

## Themes:

- Domain-specific expertise development and its implications for instructional design for complex learning.
- Learner guidance and support mechanisms in learning communities and environments based on rich learning tasks.
- Development of (alternative) forms and techniques for formative and summative assessment of complex performances.

## Theoretical contributions: Instructional Design Theory

- Complex Learning: four-component instructional design model (4C/ID-model)
- Multimedia Learning (Cognitive Load Theory)
- Collaborative Learning

# Technology Development Programme

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# Learning Networks Programme

A Learning Network is a network of persons who create, share support and study learning resources ('units of learning') in a specific knowledge domain.

## Objective:

Develop a coherent set of e-learning technologies to establish learning networks for lifelong learners.



# Key issues

- Put the lifelong learner center stage
- Support for formal education, non-formal (further) education and training and informal learning
- Support learners with collaborative filtering techniques to navigate in the learning network
- Support learners to assess their existing competences and to map them to a position in a learning network
- Decrease the workload of teachers and learners
- Use and develop open standards and open source software

# Themes LN - internal projects

## 1. Learning Networks Integrated

## 2. Learner Positioning in Learning Networks

- Assessment model
- Positioning

## 3. Make & Use Activity Nodes in Learning Networks

- ASA (support)
- SEP (social software)

## 4. Navigation in Learning Networks

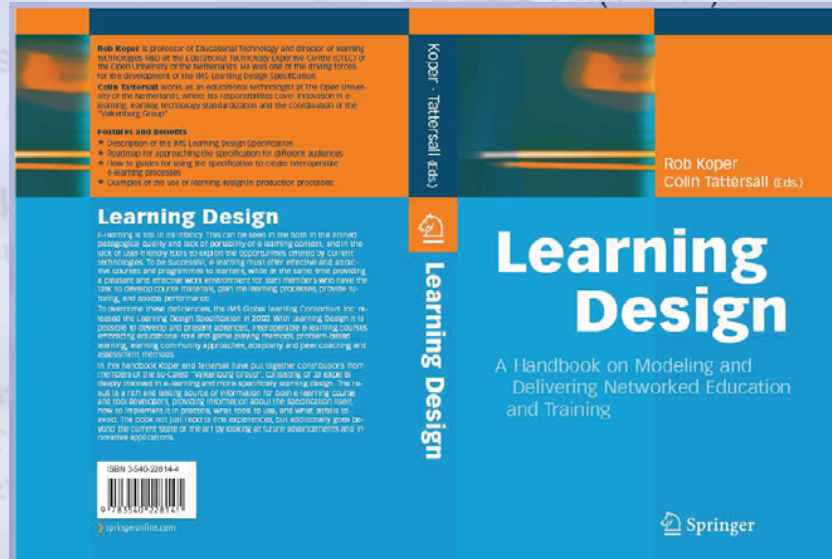
- ROMA (navigation)
- ISIS (navigation)

# External Projects

- E-LEN (Learning Design Patterns)
- aLFanet (Adaptive, standards-based elearning)
- UNFOLD (Standards dissemination & COP in particular IMS-LD)
- TELCERT (Application Profiles and conformance testing)
- COOPER (Project based learning)
- TENCompetence .....

# Standards

- IMS-LD (2003)
- CopperCore (IMS-LD open source player)
- Publications



# TENCompetence Aim

TENCompetence will meet the needs of users (individuals, groups and organisations in Europe) for lifelong competence development by establishing the best infrastructure which is possible today, using open-source, standards-based, sustainable and extensible technology.

TENCompetence will *conduct RTD activities* to further develop and integrate models and tools in four specific areas: the creation, storage and exchange of

1. knowledge resources,
2. learning activities & units of learning,
3. competence development programmes and
4. networks for lifelong competence development.

# TENCompetence Partners

<b>Participant organisation name</b>
Open Universiteit Nederland (Coordinator)
Software de Base, S.A.
LogicaCMG
Fundació Universitat Pompeu Fabra
GIUNTI Interactive Labs s.r.l.
Centre for Research and Technology - Hellas
Universität Hannover
Institut Europeen d'Administration Des Affaires
The University of Bolton
Universiteit van Amsterdam
Sofia University "St. Kliment Ohridski".
Stichting SURF
Synergetics

# TENCompetence

'7 key problems'

- The **pedagogical models** that are applied in training, schools and universities do not meet the demands and possibilities of lifelong competence development and the new learning technologies that are available.

TENCompetence will provide new, promising, innovative pedagogical approaches for lifelong competence development, supported by the TENCompetence infrastructure.

- For individuals, groups and organisations in Europe it is still hard to **get an overview** of all the possible formal and informal knowledge resources, units of learning, programmes and learning networks that are available, and to identify the most appropriate for their needs.

TENCompetence will provide tools to support individuals, groups and organisations in Europe to find the best solution for their formal or informal learning problem.

- The **pro-active sharing of knowledge** and learning resources is a major problem

TENCompetence will provide policies and software agents that support the pro-active sharing of knowledge and learning resources.

# TENCompetence

'7 key problems'

- For an organisation in Europe it is still hard to **assess the competencies** of applicants, employees and learners who have studied and worked in a variety of settings.

TENCompetence will provide models and software tools to assess the competencies of individuals, groups and organisations in an exchangeable way.

- The availability of **support** is crucial for effective task performance. Current e-learning and knowledge management environments provide too little effective support to the users in their various tasks.

TENCompetence will deliver software for the effective and efficient support of users who create, store, use and exchange knowledge resources, learning activities, units of learning, competence development programmes and networks for lifelong competence development.



# TENCompetence

'7 key problems'

- **Centralized models** for the management of a network **do not work in Europe.**

TENCompetence will provide models and software solutions to establish a decentralized, self-organized and empowered management model when using the TENCompetence infrastructure.

- Although the three areas of **Knowledge Management, Human Resource Management and e-Learning** share many common themes but there has been little unifying work which integrates models and tools for competence development during learning and working and across a lifetime.

TENCompetence will integrate isolated tools that are available in the field.

**Consortium Management Activities**

**Aspect RTD activities**

- Knowledge Resource Sharing & Management
- Learning Activities & Units of Learning
- Competence Development Programmes
- Networks for Lifelong Competence Development

**Integration RTD activities**

- Requirements & Analysis of the Integrated System
- Technical Design & Implementation of the Integrated System
- Pilots with & Validation of the Integrated System

**Valorisation activities**

- Training
- Dissemination & Exploitation

# More information

- <http://www.ou.nl>
- <http://dSPACE.ou.nl> (publications, preprints, software)
- <http://www.learningnetworks.org>
- <http://www.tencompetence.org>

# ASA Project

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# Overview

(WP7/WP8 TENCompetence)

- Inventory the problem: two surveys
- Solution: explored in current OUNL project
- Current work: model calibration
- Next: software update & experiment(s)

## **Identification of critical time-consuming student support activities in e-learning**

**Fred J. de Vries\*, Liesbeth Kester, Peter Sloep, Peter van Rosmalen, Kees Pannekeet and Rob Koper**

*Open University of The Netherlands*

Higher education staff involved in e-learning often struggle with organising their student support activities. To a large extent this is due to the high workload involved with such activities. We distinguish support related to learning content, learning processes and student products. At two different educational institutions, surveys were conducted to identify the most critical support activities, using the Nominal Group Method. The results are discussed and brought to bear on the distinction between content-related, process-related and product-related support activities.

# Problem Identification

- Two target groups
  - educational experts with Open University (online)
  - teachers with Fontys teacher education school (f2f and blended)
- Two questions
  - which support activities are taxing?
  - which support activities deserve attention, but receive too little of it because they are time-consuming?

# Method

- Nominal group approach
  - answer the questions, post them on a blackboard, explain them, add new questions, rephrase questions
  - score the questions for relevance
- Categorisation by experts
  - problems with the subject matter and content
  - problems with the learning process
  - problems with the assessment



# Selection

- Focus:

- **question-answer**

- High frequency
- Disruptive
- Important for the learner
- Possibility to explore language technology

- through *peer support*

# Question

**Ask your question**

What is the difference between heat and temperature? If it gets warmer, the temperature gets higher too! But apparently the same amount of heat can lead to different temperature increases. How come?

**Cancel** **Submit**

# ENHANCING SOCIAL INTERACTION AND SPREADING TUTOR RESPONSIBILITIES IN BOTTOM-UP ORGANIZED LEARNING NETWORKS

Liesbeth Kester  
Peter Sloep  
Francis Brouns  
Peter van Rosmalen  
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## ABSTRACT

A Learning Network is an ensemble of individual users, institutions and learning resources which are mutually connected through and supported by information and communication technologies. Learning Networks are particularly attractive to self-directed learners, who themselves decide on their learning program as well as on the timing, pace and place of their studies. Such learners may easily become isolated, which is detrimental to their studies. Supporting them is difficult and, if done properly, may rapidly lead to staff overload. This paper discusses of *ad hoc, transient communities* as a means of tackling both problems. It is argued that such communities are well poised to enhance the sociability of a Learning Network and increase learning effectiveness.

# Essence of the approach

- to develop learning technologies that help 'tutors' support their 'students' in learning networks

&

- to foster the social cohesion



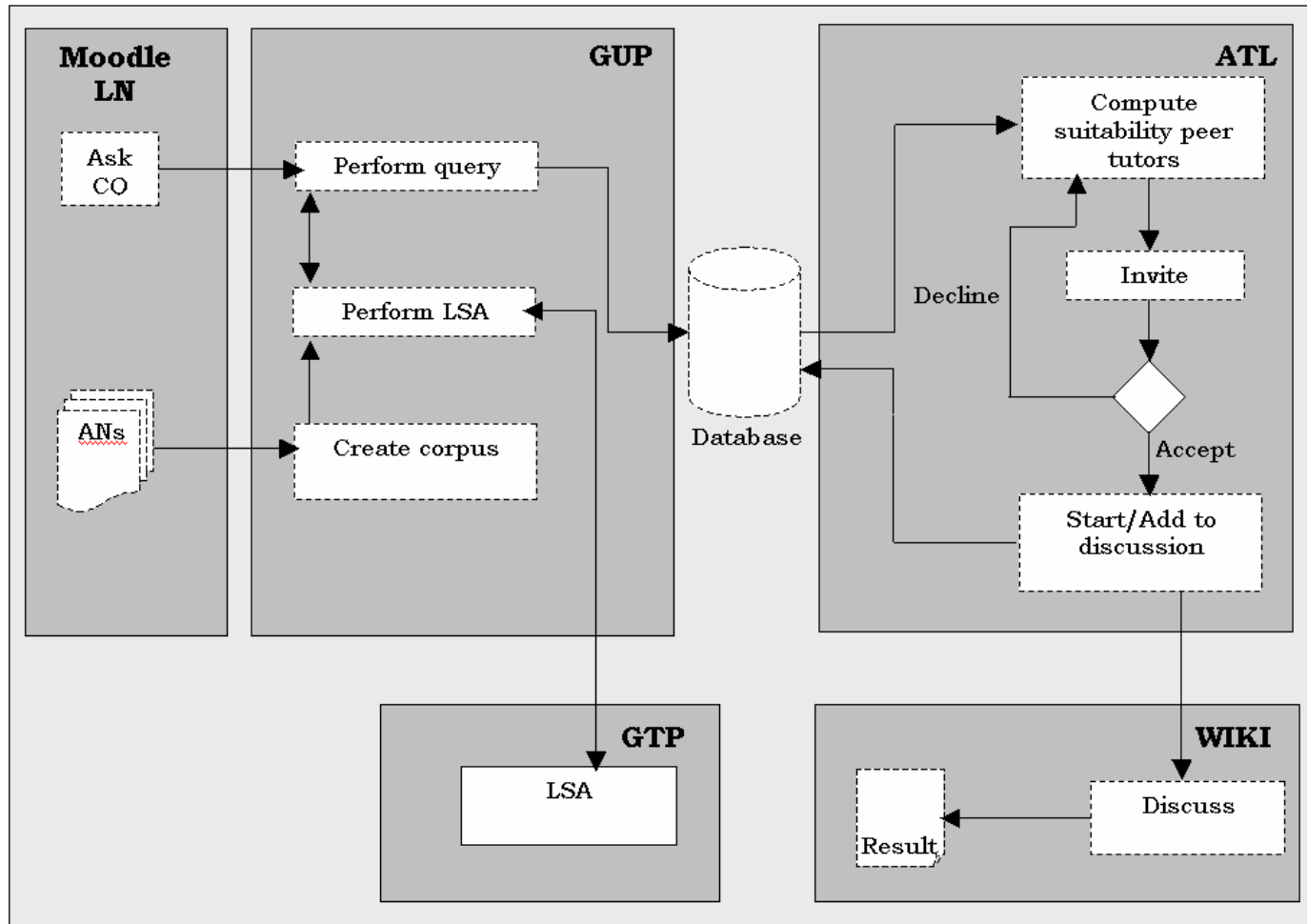
# Essence of the approach

- find suitable peer tutors
- analyse student questions with Latent Semantic Analysis: map the questions on the Activity Nodes
- set up a wiki and create an *ad hoc*, *transient* community
- seed the wiki with proto-answers found with LSA
- (store the results (log files, student portfolio, FAQ) for later use)

# Steps

- Create & calibrate a corpus from the LN
  - each document belongs to an AN
- For each question, map (LSA) the question on the corpus
  - ranked set of (correlation, doc)
- Look at the top 3 of the ranked set
  - question – AN(s) association (peer identification)
  - three proto answers (feed to ad hoc, transient community)
- set up a wiki and create an *ad hoc, transient* community
  - seed the wiki with proto-answers found with LSA

# Software



# Current Work

## - model calibration & simulation -

- Does the model work:
  - identify an appropriate combination of LSA parameters
- Is it possible to do it efficiently:
  - a simple, programmable procedure
- How will it work in real use:
  - a simulation of the model: a LN + 16 'student' questions



# Calibration Steps

Initial setting based on literature

Simple depth-first strategy:

- **Create the corpus**

- Copy of raw material
- (1) Correlation measure and method – cosine & top 3
- (2) Pre-processing: stoplist selection – 33%, 50%, standard

- **LSA parameters**

- (3) Normalisation –  $y / n$
- (4) Global weights - inverse document frequency, logarithm and entropy
- (5) Singular values – 30/40/50% of square

# Results

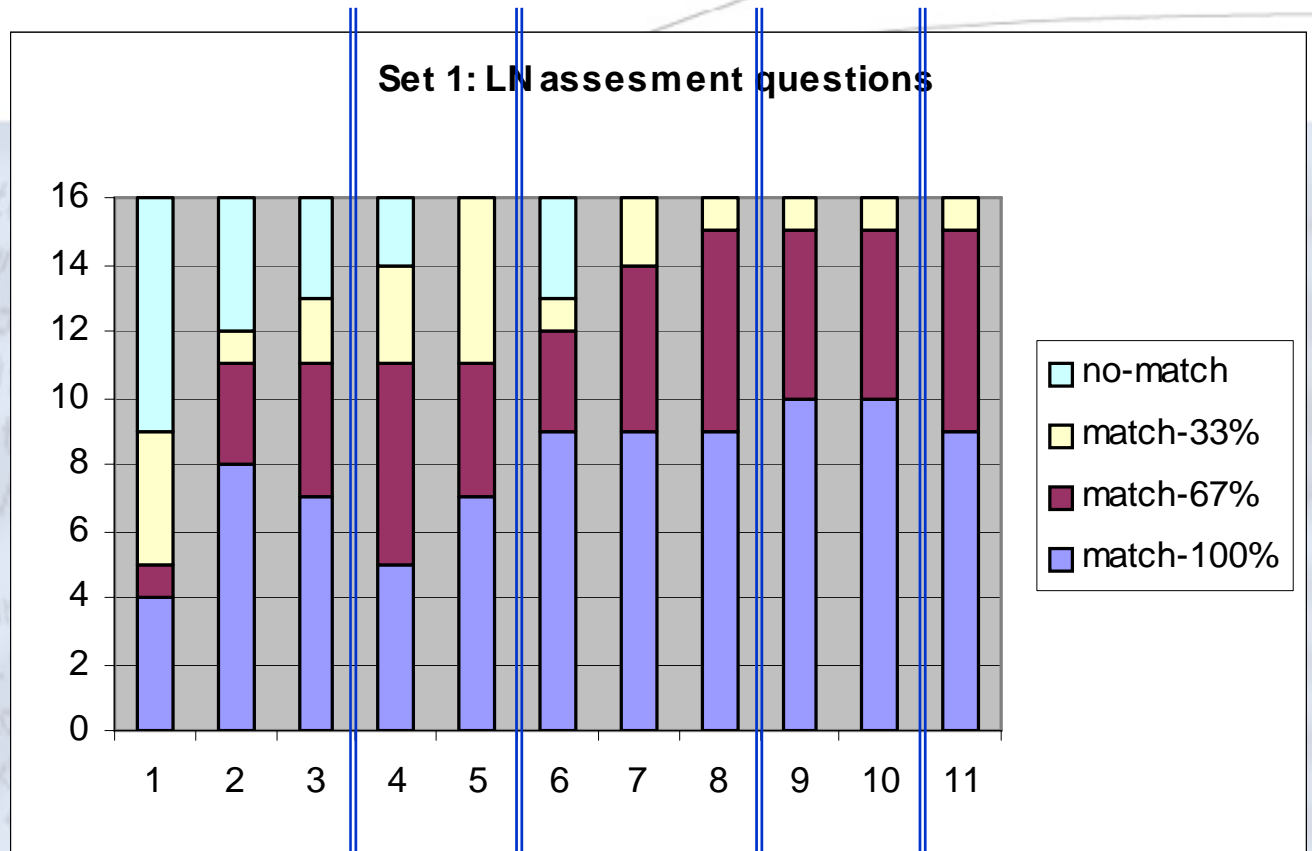
A LN on 'Internet Basics': 11 ANs

Corpus is relatively small:

- 327 documents in size ranging from 50 to 23,534 bytes (41 documents smaller than 250 bytes; 50 documents above 3,000 bytes).
- a total of 82986 words divided over 10601 terms, 4440 of which occur in at least 2 documents

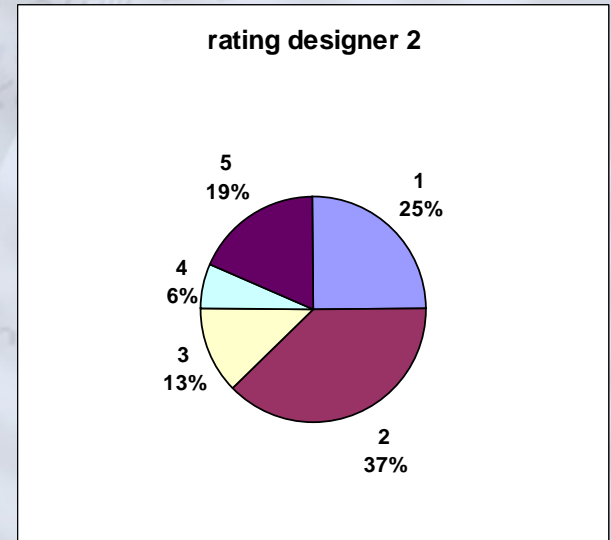
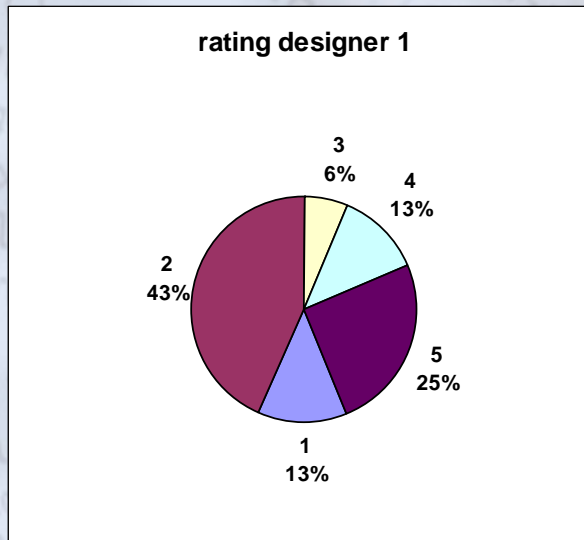
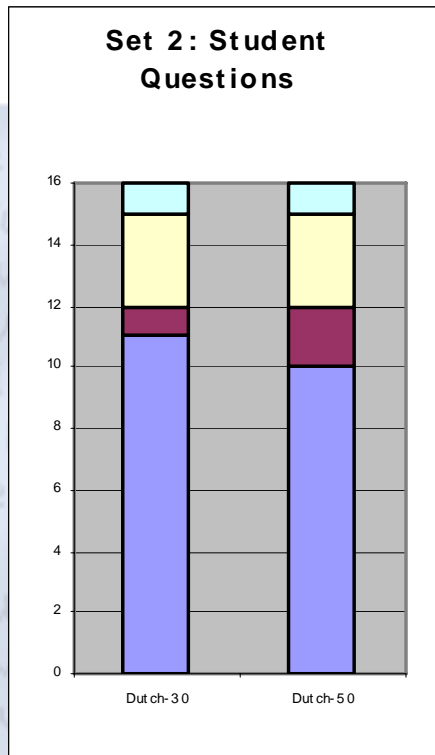
# Results Calibration

**11 ANs**  
**16 Assesment Questions**



# Results Simulation

11 ANs; 16 Student Questions



No available useful text designer-1: 5 of 9; designer-2: 6 of 10

# Conclusion – so far

Model is technically feasible

- Calibration approach
- Recognition rates & text suggestions

Peer involvement may improve the learning, the social cohesion (literature) & addresses the need for support

Experiments required to determine:

- the ad hoc, transient community conditions
- usability & user acceptance

# Questions .....

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..... [peter.vanrosmalen@ou.nl](mailto:peter.vanrosmalen@ou.nl)