

A Placement Web-Service for Lifelong Learners

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A Placement Web-Service for Lifelong Learners

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Overview

- Motivation/Problem Description
- Approach: Latent Semantic Analysis
- Evaluation Studies
- Web-Service Prototype
- Hybrid Personalizer/TENCompetence



Motivation/Problem Description

- How to find learning activities that fit to the prior knowledge of learners?
-in informal learning environments/learning networks?
-with the absence of metadata or ontological descriptions?
- This is what we coin the “positioning” or “placement” problem.



Approach: Latent Semantic Analysis (LSA)

- Assumption: We can model the importance of learning activities via the similarity between the content of the learner portfolio and the content of learning activities
- Method for Similarity Calculation: Latent Semantic Analysis (Deerwester, Dumais, Furnas, Landauer, & Harshman, 1990)

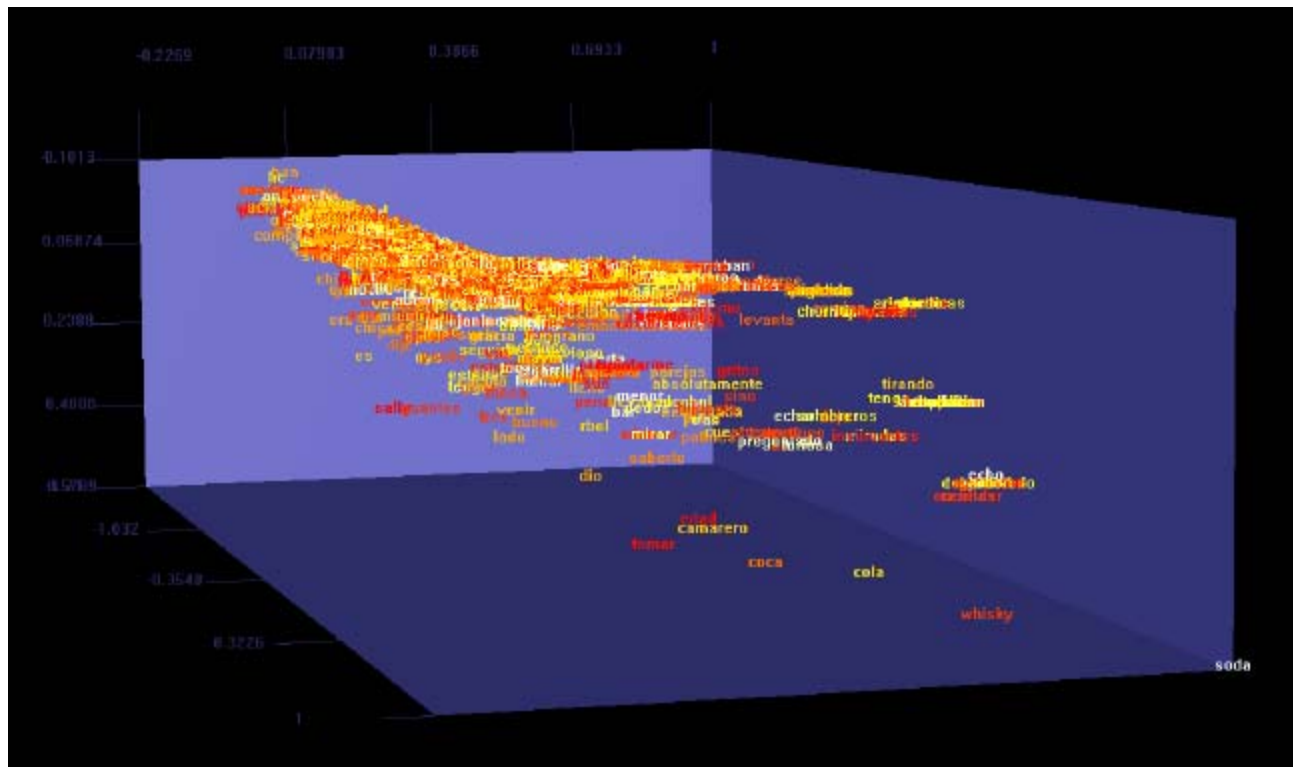


Latent Semantic Analysis (LSA) I

- LSA is a theory and method for extracting and representing the **contextual-usage meaning of words by statistical computations**
- Complex method involving several steps:
 - Preprocessing:
 - Stopwords, Weighting, Local Frequency, Global Frequency
 - Term-Document-Matrix (TDM)
 - Singular-Value-Decomposition (SVD)->LSA space
 - Querying: Terms similar like term X, Documents similar like document X
 - Advantage to keyword-based approaches: Latent relations



Latent Semantic Analysis (LSA) II

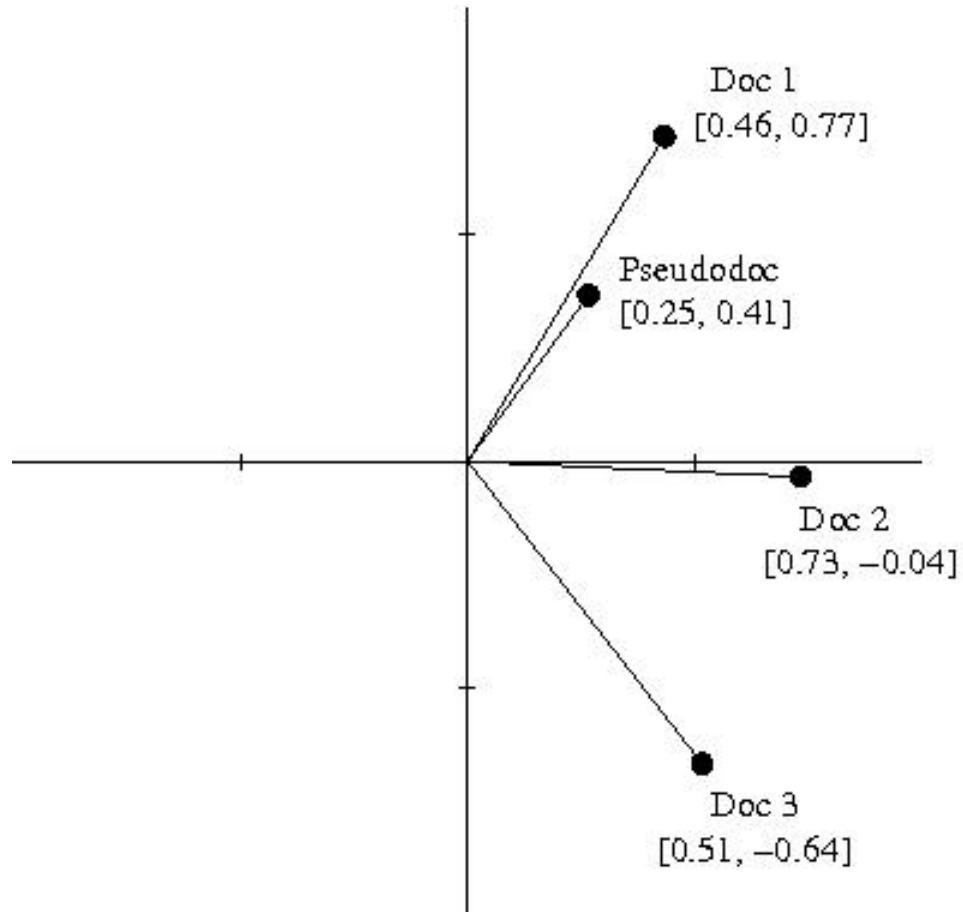


San Miguel 2006

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Latent Semantic Analysis (LSA) II



Gorell 2005

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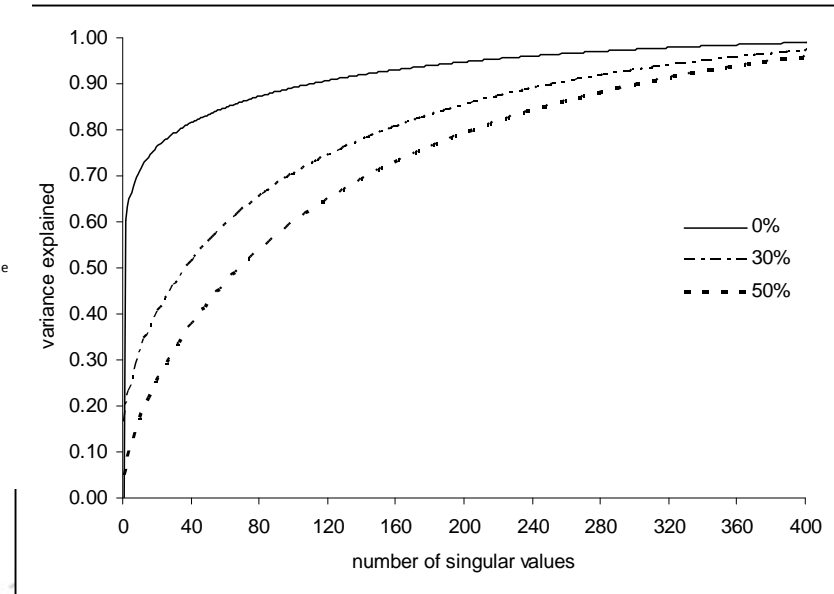
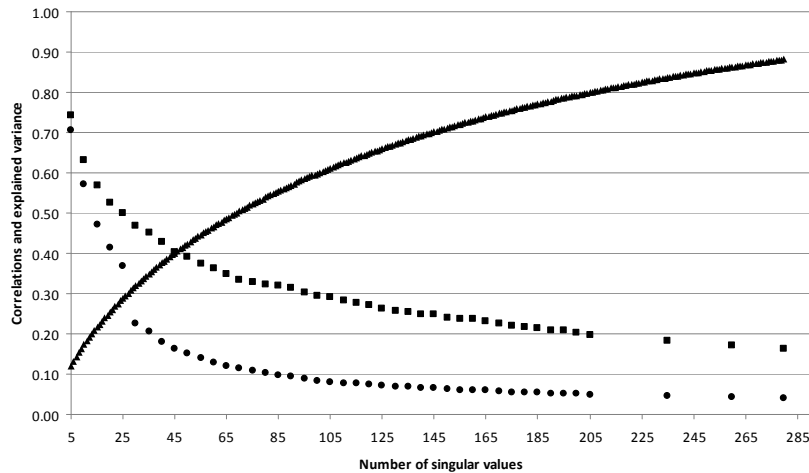


Evaluation Studies

- Study 1: Methodological study to evaluate the general applicability for our purposes. Special focus: small corpora
- Study 2: Performance Evaluation of using LSA as a classification method for “meaningful” content for an individual learner



Evaluation Study I



Important Results: The application of up to 50% stopwords and the identification of the ideal number of dimensions to retain in LSA are important factors for the application of LSA with smaller corpora



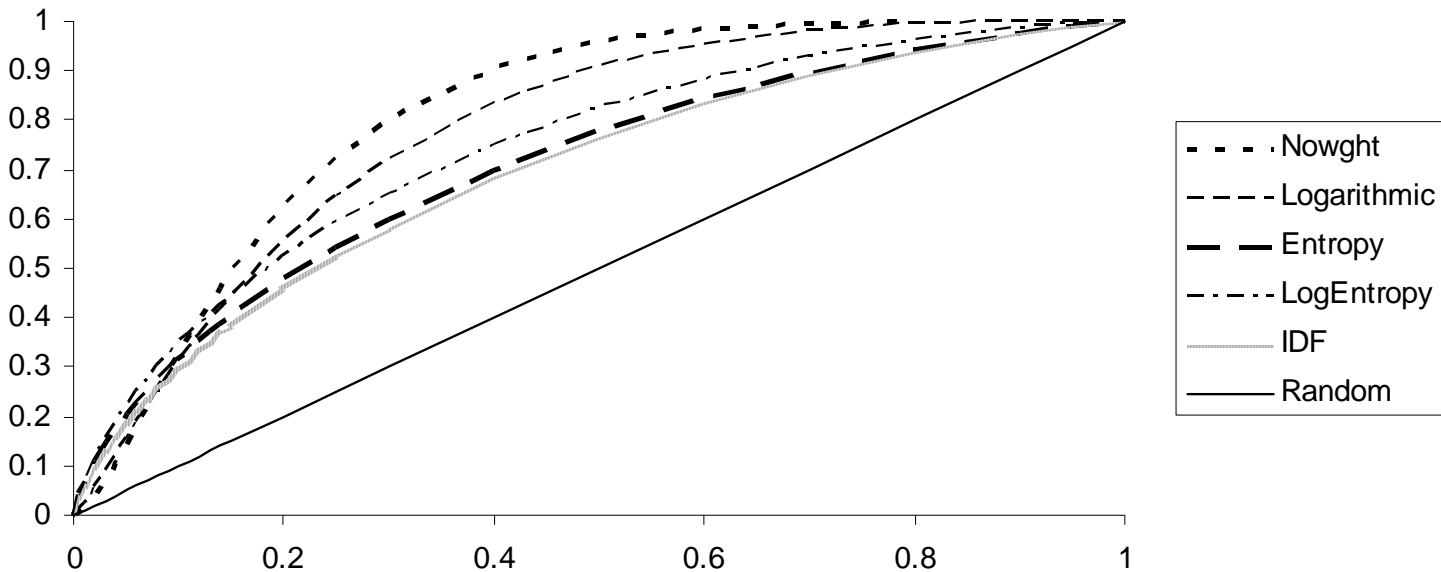
Evaluation Study II

		Human rating	
		Relevant	Irrelevant
LSA rating	Relevant	28	40
	Irrelevant	12	424

Table 1: Confusion Matrix for LSA as classifier for “meaningful” content (n=504)



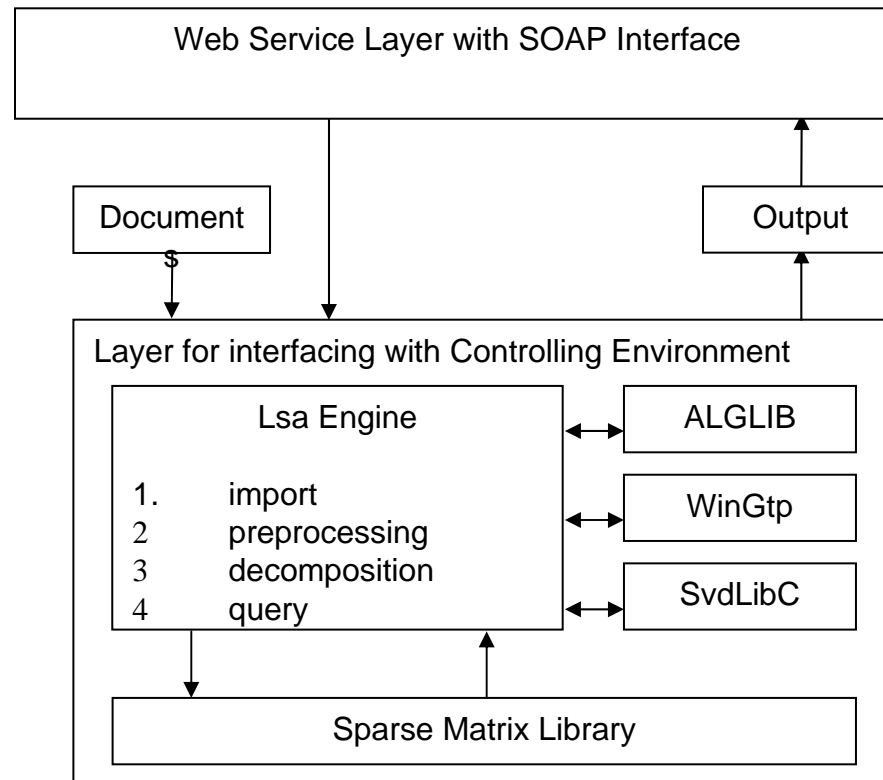
Evaluation Study II



AUC (Area under the ROC curve) value=.81 (95% CI, Std Err. = 0.0262)



Architecture of the Placement Web-Service

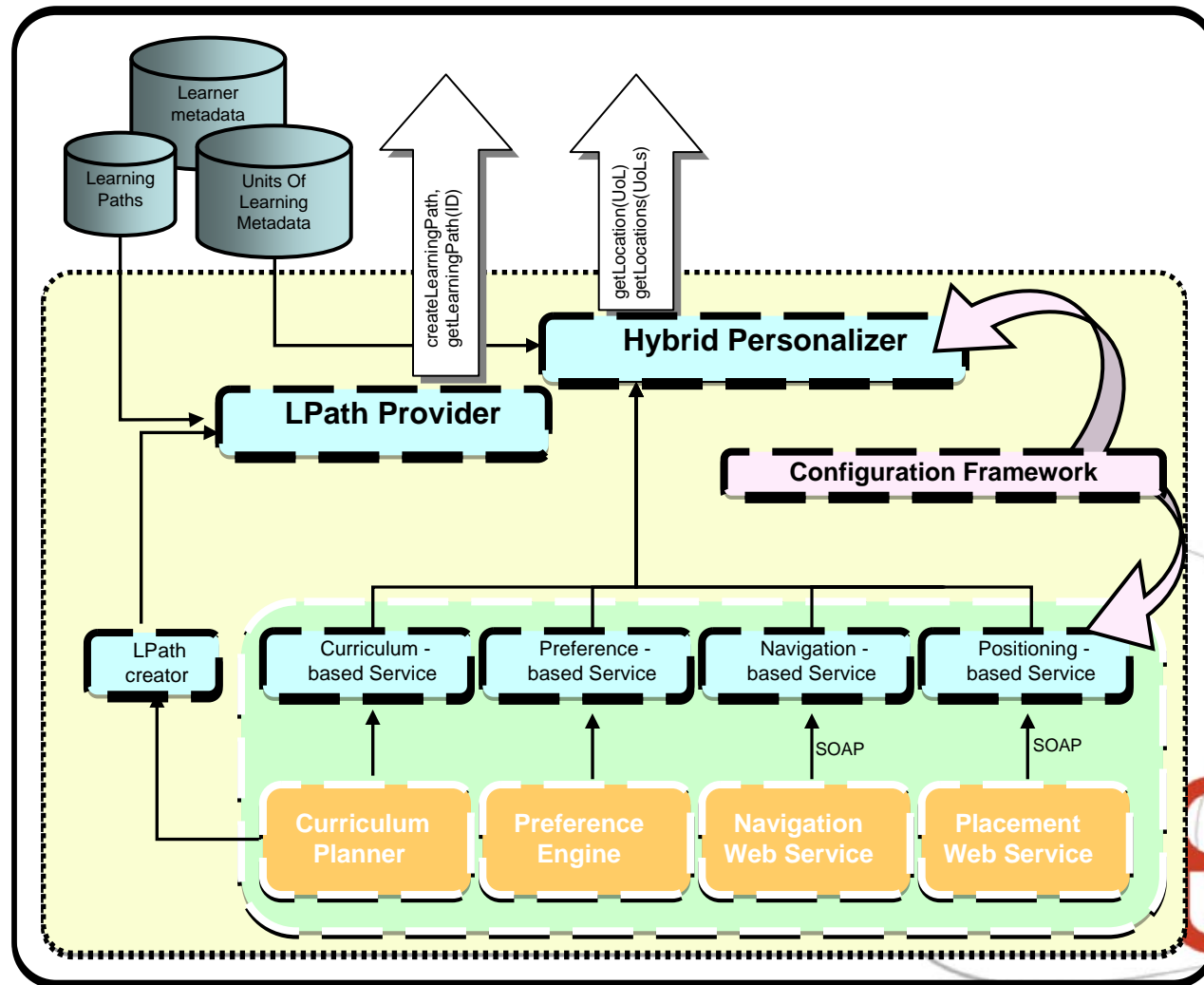


Architecture of the Placement Web-Service

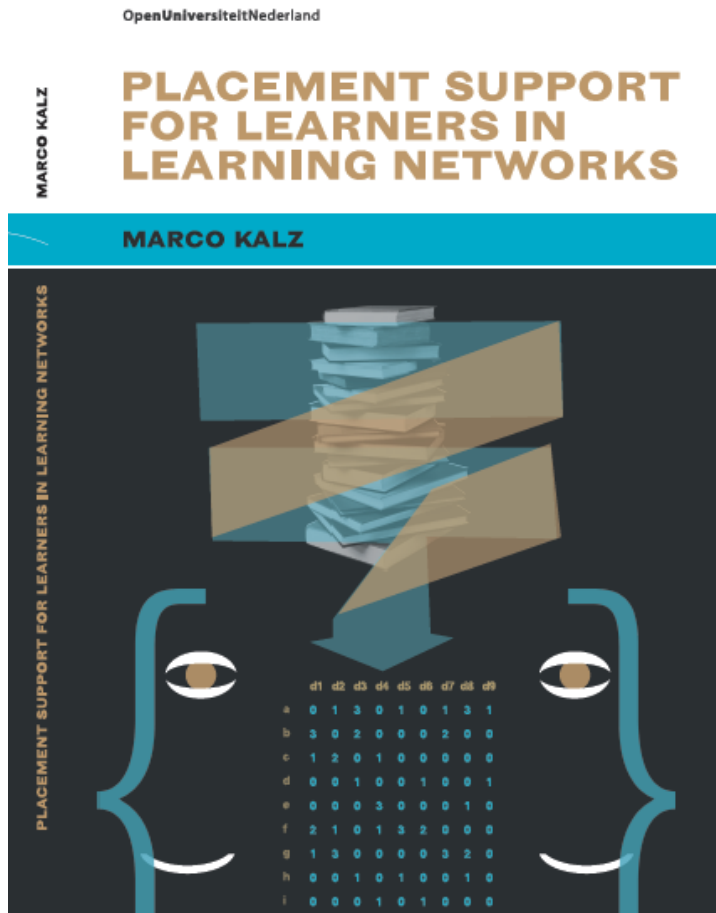
Placement Web-Service Interface (API)				
Name	Method	Description	Input	Output
getPositionValues	Get	Return a list of UoL annotated with cosine values	Iduser=xx	2-dimensional array of floats. Each UoL with its calculated cosine values.
Frequency		DATA Fields		Format
On request.	EventType	Iduser = Integer Learninggoal = Array (Strings)		



Role of the Placement Web-Service in the TENCompetence infrastructure



Contact



Thank you for your attention!

Questions?

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Presentation will be at <http://dspace.ou.nl> &
<http://slideshare.net/mkalz>



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