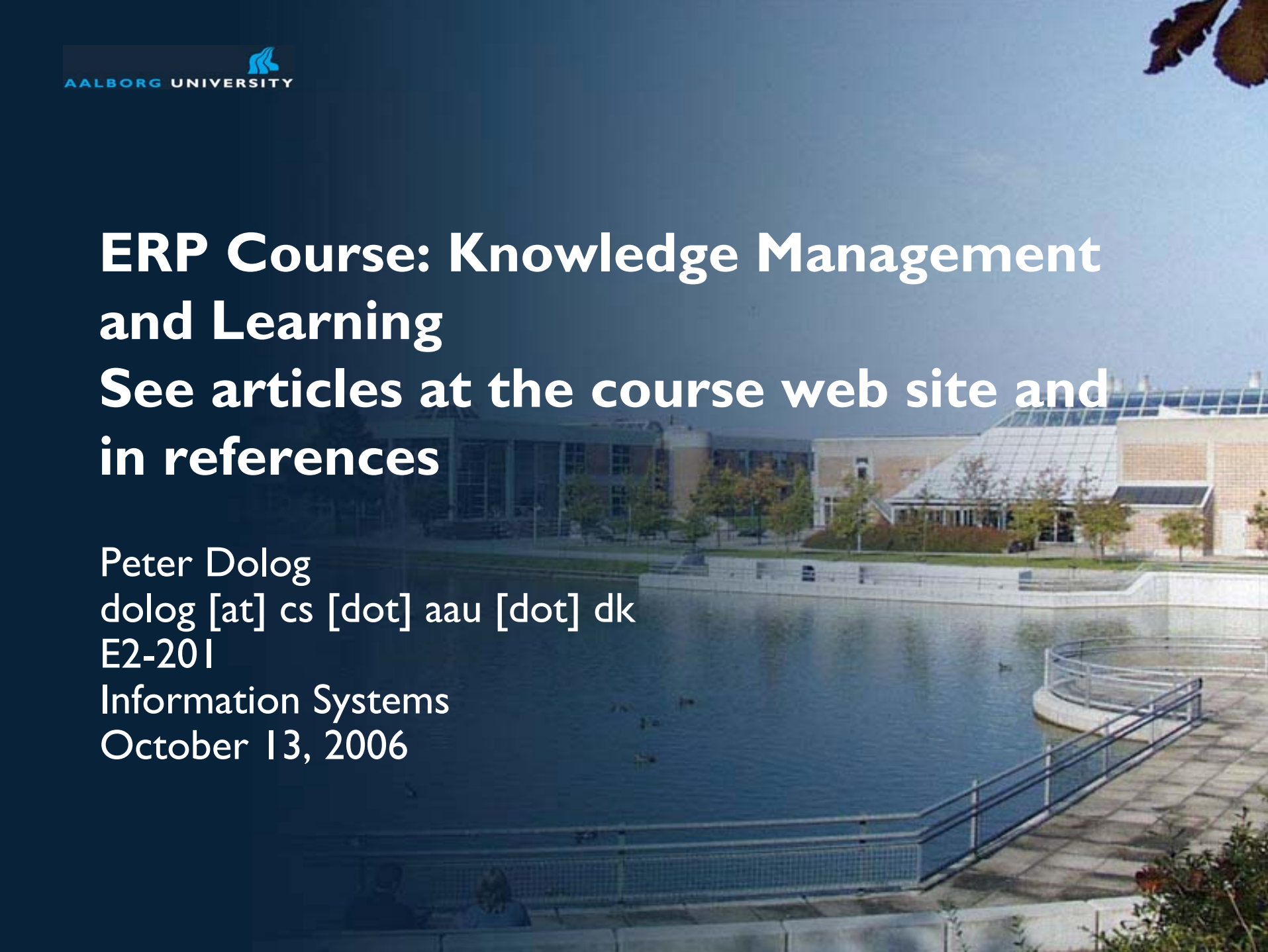


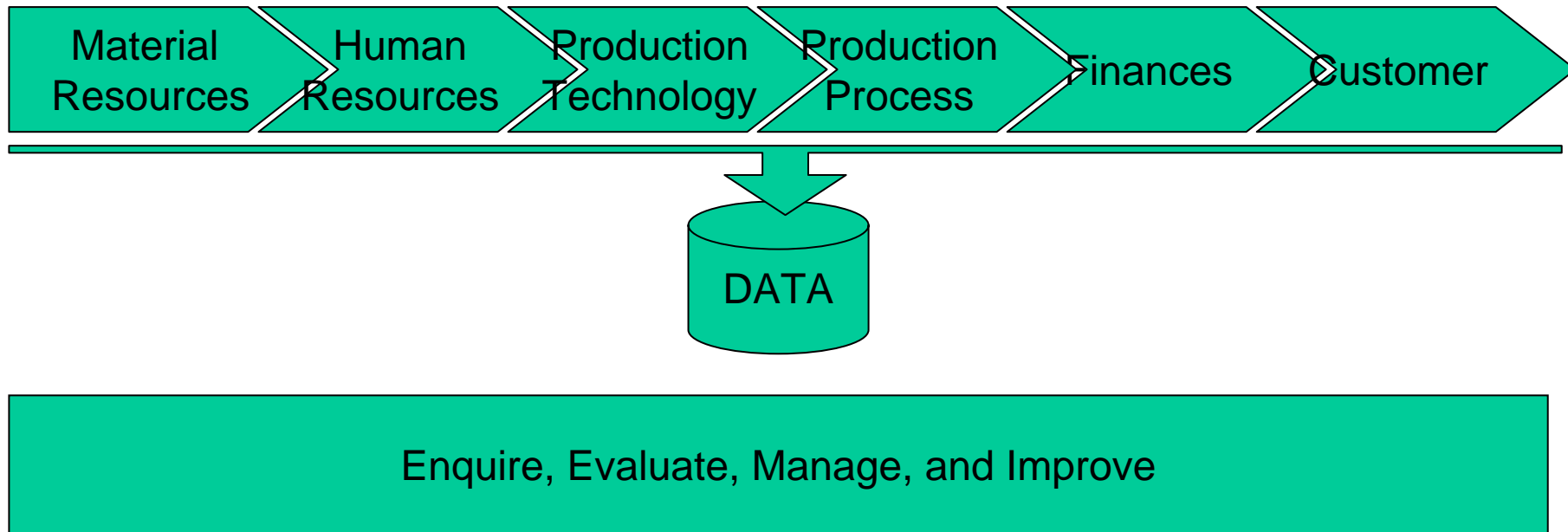
# ERP Course: Knowledge Management and Learning

See articles at the course web site and  
in references

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E2-201  
Information Systems  
October 13, 2006



# A Company



# Knowledge Management

Knowledge Management is

- A set of systematic and disciplined actions
- To get a greatest value from the knowledge available to it

Knowledge in this context include

- Experience and understandings of people
- IT artifacts (resources, digital objects, documents, ...)

Knowledge Management involves:

- Organizational, social, and managerial actions
- Technology

# Organizational Learning (Nonaka)

Conversion of knowledge between tacit and explicit forms (both important for organizational effectiveness)

## Tacit knowledge

- known
- derived from experience
- embodies beliefs and values
- actionable
- source of innovation

## Explicit knowledge

- represented by an IT artifact
- used in communication between several parties

# Conversions

<p>Tacit to Tacit <b>SOCIALIZATION</b></p> <p>e. g. team meetings and discussions</p>	<p>Tacit to Explicit <b>EXTERNALIZATION</b> (conceptualization, elicitation, and articulation)</p> <p>e. g. dialog within a team, answer questions</p>
<p>Explicit to Tacit <b>INTERNALIZATION</b></p> <p>e. g. learn from a report</p>	<p>Explicit to Explicit <b>COMBINATION</b></p> <p>e. g. e-mail a report</p>

# Tacit to Tacit

Tools which support communication

Supplementing or enhancing classical meetings

Replacing face to face meetings

Groupwares

Locating experts

# Shared experience and knowledge

## Asynchronous

- Listening to recorded presentation
- Using news and virtual discussion forums
- Tools to comment and annotate such presentation or a jointly created documents

## Synchronous

- Virtual on line meetings
- Voice over IP
- Video conferencing
- Instant messaging

BSCW.de

Vertriebsplanung - Microsoft Internet Explorer

Adresse: http://maestral.gmd.de/dogi/bscw.cgi/0/21691

# BSCW

Arbeitsbereich: :Teamleiter / Vertriebsplanung

bestätigen kopieren ausschneiden entfernen archivieren bewerten

- Vertriebsplanung
  - Korrespondenz mit Vertriebspartnern, Verträge und Vertriebsmaterial

Name	Teilen	Notiz	Eigentümer	Datum	Neu	Aktion
<input type="checkbox"/> Termine			Teamleiter	2001-07-30 13:48		
<input type="checkbox"/> Korrespondenz			Teamleiter	2001-07-30 10:46		
<input type="checkbox"/> Verträge			Teamleiter	2001-08-09 12:25		
<input type="checkbox"/> Preisliste.doc			Schmidt	2001-07-30 10:53		
<input type="checkbox"/> AdressenPartner.xls			Schmidt	2001-07-30 11:51		

Verträge: Vertragsentwürfe und abgeschlossene Verträge

AdressenPartner.xls: Adressliste der Partnerfirmen

BSCW © 1995-2001 GMD, © 2001 OrbTeam

Fertig Internet



<http://kmi.open.ac.uk/>



KNOWLEDGE MEDIA  
**KMi**  
INSTITUTE

0:40:35 Understanding Presence 4 joined list thumbs


Marc  
HIGH **BROADCAST** Interrupt

Powered by CNM FlashMeeting

## Finding a person

Common interest to create an innovation

Expert to help with a specific problem

Team creation for a specific assignment

A person for peer review

Search engines for people

Based on profiles

- Explicit evidence
- Extracted evidence from portfolios, projects, and activities
- Derived evidence from social interactions

# Tacit to Explicit

Creating a shared mental model

Describing/externalizing it in an IT artefact

Problem tickets in call centers

Their associations to problems

Frequent problems/questions

Metadata, conceptual models, ontologies

Formal concept analysis

Matching problem descriptions with existing solutions

<http://www.saleslogix.com/>

Saleslogix - [Ticket: 001-00-000015]

File Edit View Insert Schedule Lookup Write Tools Outlook Window Help

**SpeedSearch**

Keywords: office 2000 Standard

Search Options: Match on any words (OR) | Search In: Activity, Attachment, Defect, Defect Internal, Document, History, Library, Procedure, Standard Problem | Filter By: Frequently Used, Category Like, Project Like, Fixed In Like, Confidence Level Like, Title Like (office 2000)

Maximum Results: 25

Results: Record 16 of 20

Subject	Source	Created	Last Updated	Keywords	Hits	Relevance
Change to Createdate, DayHistory	History	2006-08-22	2006-08-22	2000 1	01	94
Proposal	History	2006-08-20	2006-08-20	office 1	01	85
Wn2000: VPN Client Conn	Standard Problem	2006-06-21	2006-06-21	2000 2	02	4
Office 2000 Install: Error 15	Standard Problem	2006-06-21	2006-06-21	office 3; 2000 1	04	4
Office 2000 Install: Error 1	Standard Problem	2006-06-21	2006-06-21	office 3; 2000 2	05	8
Share folders	Standard Problem	2006-05-23	2006-05-23	2000 1	01	1
Wn2000: Returning from H	Standard Problem	2006-06-21	2006-06-21	2000 1	01	1

Preview: Body | Record 16 of 20

Notes: Microsoft (Q324628)

When you run Setup for any of the programs listed at the beginning of this article, you may receive the following error message:

Error 1919. Error configuring ODBC data source: MS Access Database. ODBC error 8: Component not found in the registry. Verify that the file MS Access Database exists and that you can access it. If you click ignore, you may receive the following error message:

Error 1919. Error configuring ODBC data source: Excel Files. ODBC error 0: Verify that the file Excel Files exists and that you can access it. You may also receive any of the following error messages:

Error 1919. Error configuring ODBC data source: MS Access Database. ODBC error 0: Verify that the file MS Access Database

# Explicit to Explicit

## Combination

### Capturing existing knowledge

- Rewarding people to make documents, problem and solution descriptions
- Use of documents, citations/references, links (page rank in google)

Multimedia analysis – speech recognition (call centers), image searching (design documents)

Search – information retrieval, digital libraries, similarity measures, exact database query, indexing, crawling

Taxonomies, Ontologies, Metadata, Text Classification, Summarization

# Explicit to Tacit

Dealing with lost in information space

Information overload

Using ontologies to visualize

Hiding, summarization

Anotations

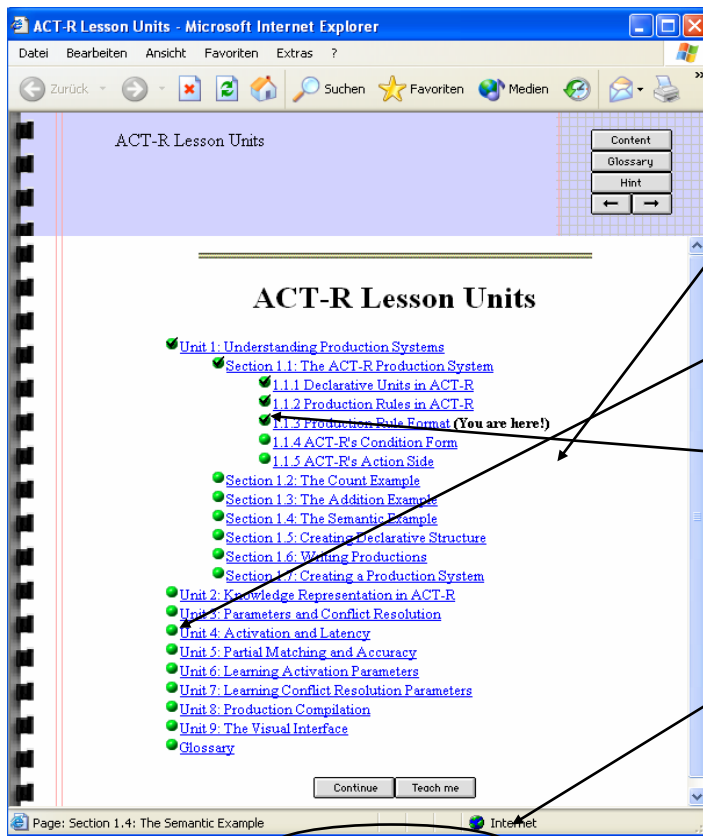
Automatic guidance

Shortcuts

Local navigation vs. global navigation

Task based navigation – association with business process or task  
to be supported

# Adaptive Course Structure Presentation in Interbook



Indication of your current position

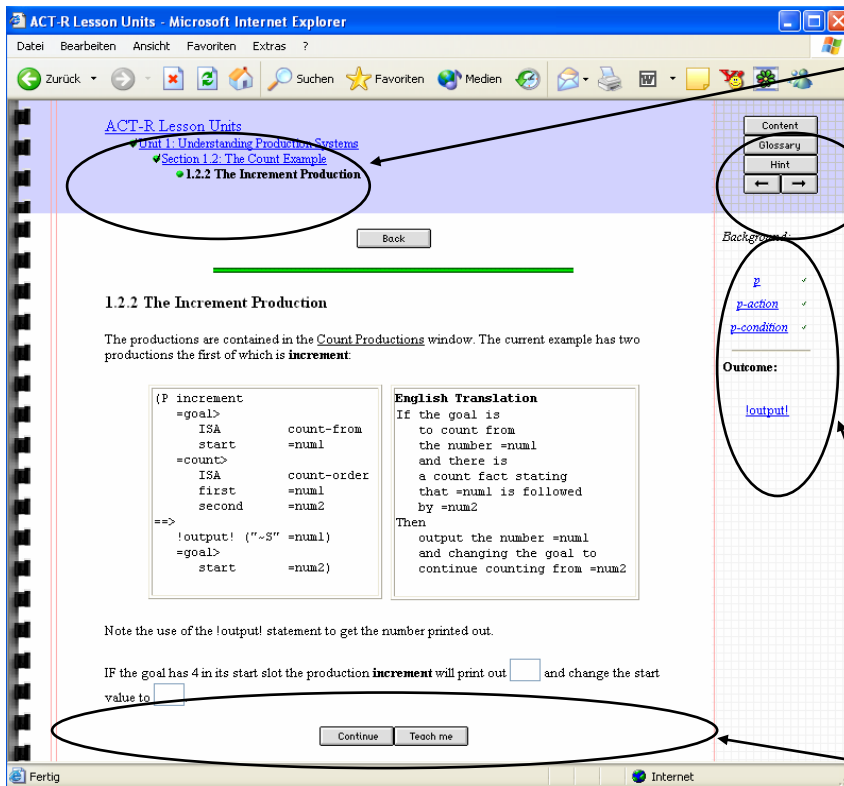
Recommendation annotations (traffic light metaphor)

Visited pages

Guidance

<http://www2.sis.pitt.edu/~peterb/>

# Adaptive Link Annotation in Interbook



Current position and upper level content

Additional Guidance

Next items in subsequence

Outcomes and prerequisites

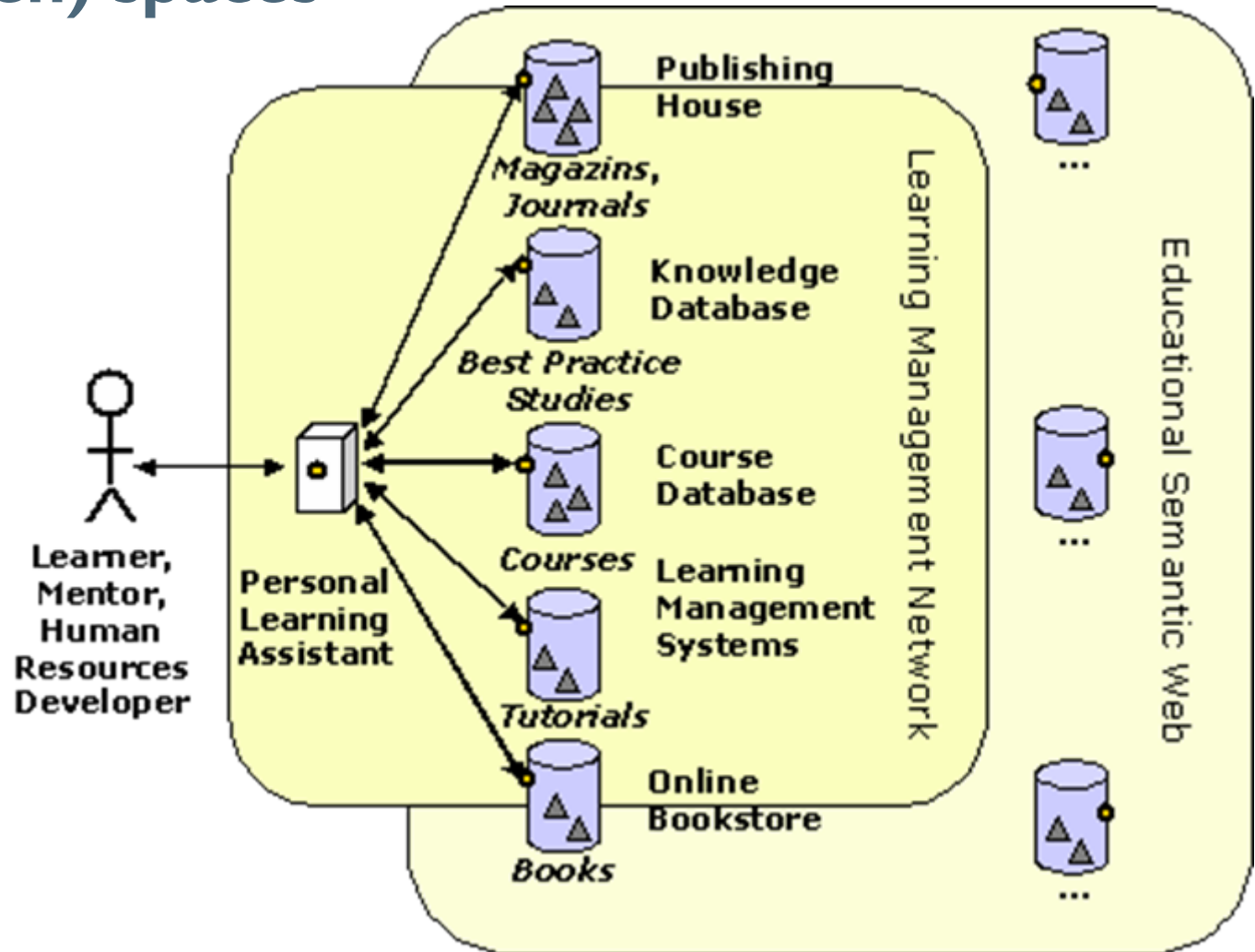
Learner Assessment



# Learning on-line in organizational context



# Smart (open) spaces



**ELENA Personal Learning Assistant**  
for SMART SPACE FOR LEARNING Peter Dolog & Michael Senk

### Personalized Search Service

Select user: Type in concept name(s):

(default) Michael Peter

intelli

Select one or more concepts from the ontology:

- Computing Mileux
- COMPUTERS AND SOCIETY
- Electronic Commerce
  - Electronic data interchange (EDI)
  - Payment schemes
  - Intellectual property
  - Distributed commercial transactions
  - Security
  - Cybercash, digital cash
- Social issues
- Employment
- Handicapped persons and special needs
- Assistive technologies for persons with disabilities
- Abuse and crime involving computers
- Organizational Impacts
  - Reengineering
  - Automation
  - Employment
  - Computer-supported collaborative work
- General
- Miscellaneous
- Public Policy Issues
  - Use and abuse of power
  - Transborder data flow
  - Privacy

personal recommendation

Search Reset

---

**ELENA Personal Learning Assistant**  
for SMART SPACE FOR LEARNING Peter Dolog & Michael Senk

### Personalized Search Service

User: michael

Select one or more concepts:

- Distributed artificial intelligence [in: ARTIFICIAL INTELLIGENCE << Computing Methodologies]
- Intellectual property [in: Electronic Commerce << COMPUTERS AND SOCIETY << ...]
- Intellectual property rights [in: Public Policy Issues << COMPUTERS AND SOCIETY << ...]
- Intelligent Agents [in: Distributed artificial intelligence << ARTIFICIAL INTELLIGENCE << ...]
- ARTIFICIAL INTELLIGENCE [in: Computing Methodologies]

---

**ELENA Personal Learning Assistant**  
for SMART SPACE FOR LEARNING Peter Dolog & Michael Senk

### Personalized Search Service

User: default

Selected concepts:  
Intelligent Agents [in: Distributed artificial intelligence << ARTIFICIAL INTELLIGENCE << ...]

Query results:

PReco	Reco	Title	Description	Concepts
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<a href="#">Aufgaben zum Thema Intelligente Agenten</a>	Aufgaben, um den Stoff des Moduls zu vertiefen	Intelligent Agents
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<a href="#">Einige Fragen zum Thema Intelligente Agenten</a>	Fragen, die Ihnen helfen sollen, den Stoff besser zu verstehen	Intelligent Agents
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<a href="#">Vorlesung Künstliche Intelligenz WS 2002 - Stichworte zum Thema Umgebungen</a>	Was stellen die verschiedenen Grundtypen Intelligenter Agenten vor und ihre prinzipielle Programmierung	Intelligent Agents
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<a href="#">Weiterführende Materialien</a>	Eine Sammlung von weiterführenden Links zum Thema Künstliche Intelligenz und Intelligente Agenten	Special-purpose; Intelligent Agents

The screenshot displays the ELENA Personal Learning Assistant interface within a Microsoft Internet Explorer browser window. The interface is titled "ELENA: PLA - Personalized Search Service" and is designed for "SMART SPACE FOR LEARNING". It is authored by Peter Dolog and Michael Sestak, and is associated with Information Society Technologies.

The main content area shows a "Personalized Search Service" for a user named "default". Below the user information, there is a "Query results:" section containing a table with the following structure:

PReco	Reco	Title	Description	Concepts
	<input checked="" type="checkbox"/>	<a href="#">JLayeredPane (Java 2 Platform SE v1.4.2)</a>	?	http://webbase.learninglab.uni-hannover.de:9000/pla/ACM_java.rdf#Container; http://webbase.learninglab.uni-hannover.de:9000/pla/ACM_java.rdf#JComponent; int; http://webbase.learninglab.uni-hannover.de:9000/pla/ACM_java.rdf#Integer; Numbers
	<input checked="" type="checkbox"/>	<a href="#">LongBuffer (Java 2 Platform SE v1.4.2)</a>	?	http://webbase.learninglab.uni-hannover.de:9000/pla/ACM_java.rdf#Array; http://webbase.learninglab.uni-hannover.de:9000/pla/ACM_java.rdf#Long; byte; if; new Operator; http://webbase.learninglab.uni-hannover.de:9000/pla/ACM_java.rdf#this; http://webbase.learninglab.uni-

The interface also features a "PERSONAL READER" sidebar on the left, a search bar at the top, and a "Trail types: Basics | GUIs | Specialize" section. A yellow vertical bar highlights the search results area, and a black arrow points from the search bar to the results table.

# Knowledge Sea

http://www2.sis.pitt.edu/%7Eir/KS/home.htm?kt\_sid=470&kt\_user=demo

The material contained in the map came from the following web sites:

- [Introduction to C Programming](#) An on-line tutorial from Leicester University
- [Introduction to C Programming by Rob Miles](#) This is an online tutorial for learning to program in the C programming language. It assumes very little previous programming or computer experience.
- [C Programming Tutorial by Brian Brown](#) This C Programming tool (Brown, 1984-1999) is an online introduction to the C programming language. It consists of a collection of web documents that are organized into chapters and subchapters. The concepts covered begin with variable declaration, arithmetic and relation operators, programming constructs, and end with dynamic memory allocation, pointers to functions, and compile options. Interspersed between chapters are optional interactive multiple-choice tests, which provide immediate feedback to each selection made by the user during his test. The feedback given takes the form of a one or two sentence response to the users selection in a popup window

http://www.hcd-online.com

Search results are currently collected. Next update in 2 seconds.

Currently used search-term(s): **economy**

Select	Relevance	Title / Description
<input type="radio"/>	100. (1)	<b>Change-Management und Innovation</b> Die Zukunft (die sogenannte Next Economy) ist eine Innovations-Economy. Nur wer sich in Zukunft auf Veränderungen einstellt, wer hohe Innovationsraten verwirklichen kann, wird am Markt bestehen. Ein ...
<input type="radio"/>	2.70 (2)	<b>The Experience Economy: Work Is Theatre &amp; Every Business a Stage</b> Availability: Usually ships in 24 hours
<input type="radio"/>	2.70 (3)	<b>Book of Common Prayer (1979, Personal Size Economy, Black)</b> Availability: Usually ships in 24 hours

Remote service status:		
Executive Academy (WBZ):		✓
LASON:	⌚	
Educella:	✗	
Seminarshop.com:		✓
CLIX:	⌚	
ULI:	✗	
Knowledgebay:	⌚	
EduSource:		✓
Metzingen VHS-Kursdatenbank:		✓
Amazon:		✓
bfi-vienna:	⌚	
EducaNext-UPM:	✗	

- To make the personalization process more flexible
- To satisfy a user if no results are returned
- To enable ranking on results based on document analysis

		Availability: Usually ships in 24 hours			
<input type="radio"/>	1.88 (11)	<b>3043 Advanced Novell Network Administration NetWare 6.5</b> NetWare 6.x wurde speziell auf die Bedürfnisse der heutigen Net Economy zugeschnitten. NetWare 6.x kann in bestehenden Netzwerken eingesetzt werden, um diese in ein einziges, alles umfassendes Netz - ...	Yes	Seminarshop.com	German
<input type="radio"/>	0.0 (12)	<b>China Reise Taijiquan Qi Gong</b> 21 Tage China Reise - Taijiquan / Qi Gong Unterricht an der Sportuniversität Peking, Rundreise zu faszinierenden Stätten der chinesischen Kultur	Yes	Seminarshop.com	German
<input type="radio"/>	0.0 (13)	<b>Szenario-Technik</b> Jeder Unternehmer, jede Führungskraft ist täglich immer wieder neu mit der Frage konfrontiert - Wie könnte mein Unternehmen/mein Bereich in ca. 1-3 Jahren aussehen? - Welche Anforderungen könnte der Ku ...	Yes	Seminarshop.com	German
<input type="radio"/>	0.0 (14)	<b>The Wisdom of Crowds: Why the Many Are Smarter Than the Few and How Collective Wisdom Shapes Business, Economies, Societies and Nations</b>	Yes	Amazon	English

## Our Approach

**The adaptivity seen as decisions among variable resources where decisions are driven by information about a user Knowledge about:**

- **Resources with metadata seen as constraints on use**
- **Learner features used for comparing to the resource metadata**

**Horn logic oriented rules in TRIPLE used to perform the matching which concludes with personalization information**

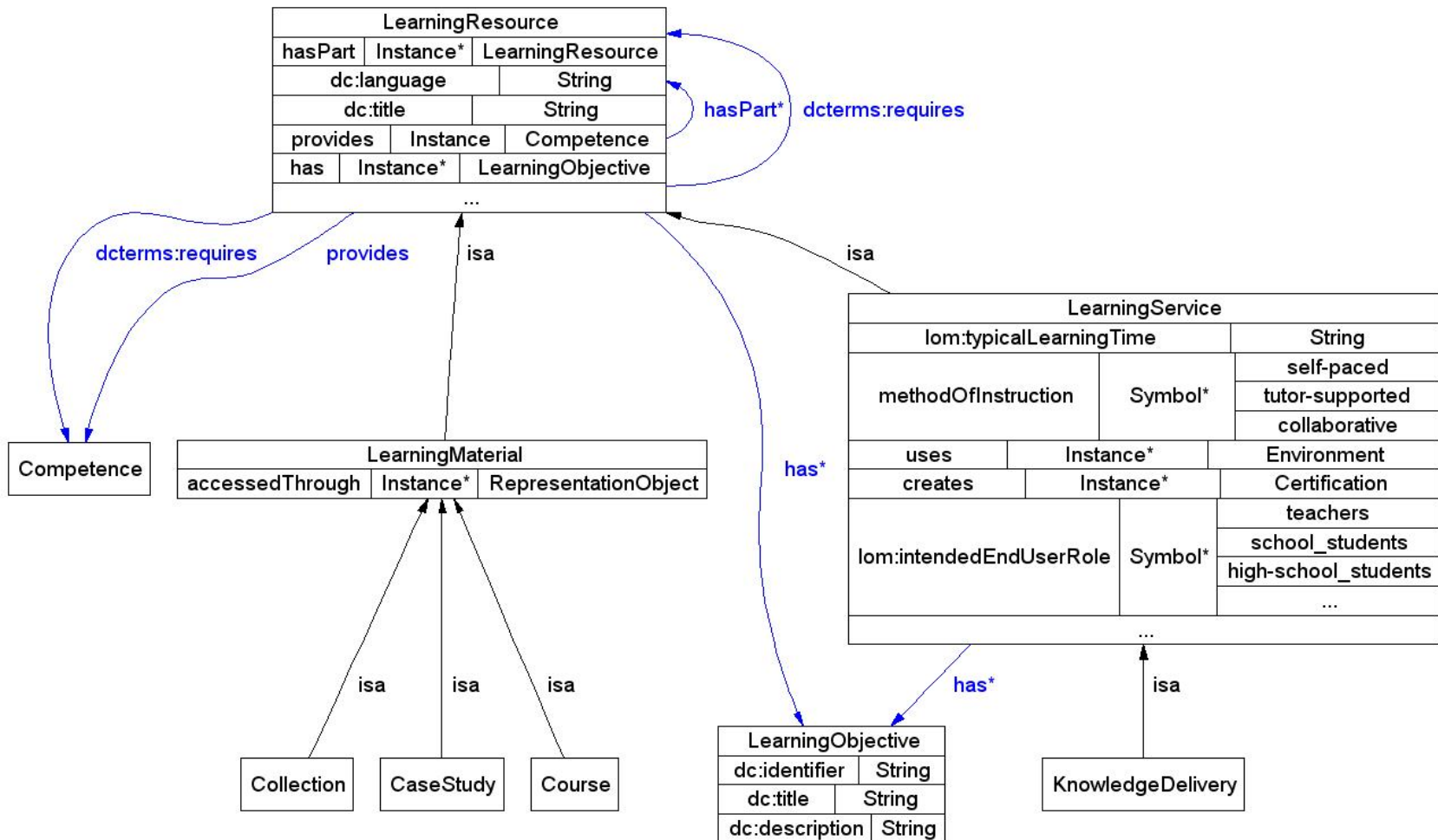
**Horn logic oriented rules in TRIPLE used to construct and rewrite user queries over metadata with restrictions based on the user profile**

## eLearning Domain – Metadata Used

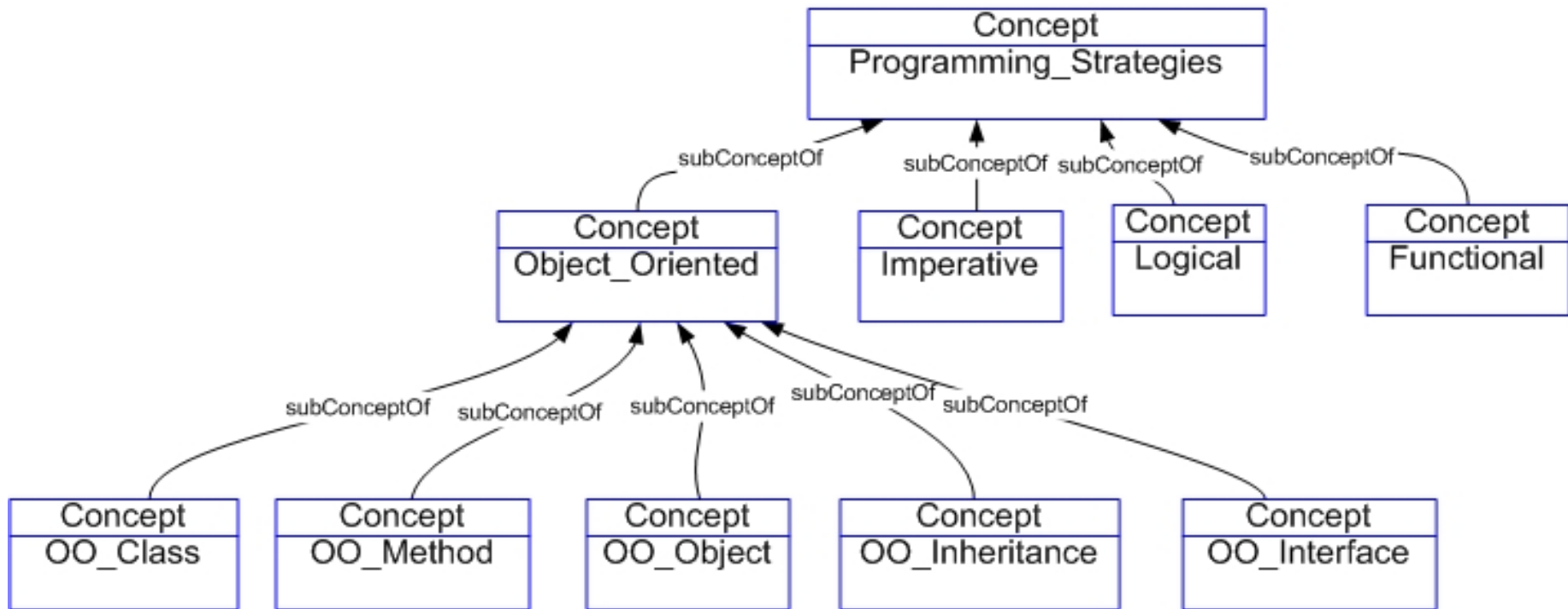
- Learning resource
  - Concepts/Competencies as learning outcomes
  - Prerequisites knowledge needed for understanding a resource
  - Prerequisites knowledge concepts/competencies to understand the concepts or to gain competencies
  - Language used in the resource
- Learner profile
  - Lerner performance, competencies/concepts previously acquired and compared to prerequisites of either resource/concept/competency
  - Language/Concept preferences



# Knowledge Structure for Resources



# Knowledge Structure for Domain Concepts – the Java Tutorial



## Examples in TRIPLE: Instance of a Learning Resource

```
kbs:'Praedikatenlogik3.pdf',
[dcq:isPartOf -> kbs:'Modul3',
  dcq:isRequiredBy -> kbs:'Resolution.pdf',
  dcq:requires ->
    kbs:'Praedikatenlogik2.pdf',
  dc:subject -> acm_ccs:'I.2.4.2.1',
  dc:language -> lang:de,
  dc:description -> 'Wie wandele ich Sätze
    der Praedikatenlogik in Konjungtive
    Normalform um',
  dc:title -> 'Vorlesung Künstliche
    Intelligenz WS 2002 : Umwandlung in KNF'
].
```

# Knowledge Structure For Learner Features

Performance

Portfolios

Goals

Preferences

Personal Information

Identification

Test Performance

# Learner Performance and Competencie

Performance		
learning_experience_identifier	String	
issued_from_identifier	Instance	Institution
performance_privacy	Instance	PrivacyInfo
performance_coding		String
Issued_By_Identifier	Instance*	Institution
CertifiedBy	Instance	Certificate
PerformancePortfolio	Instance*	Portfolio
Valid_from	String	
PerformanceId	String	
Issued_date	String	
Valid_to	String	
performance_value	Float	
learning_competency	Instance*	Competencies:RDCEO
		Concept
granularity	String	
Recorded_date	String	
performance_metric	String	

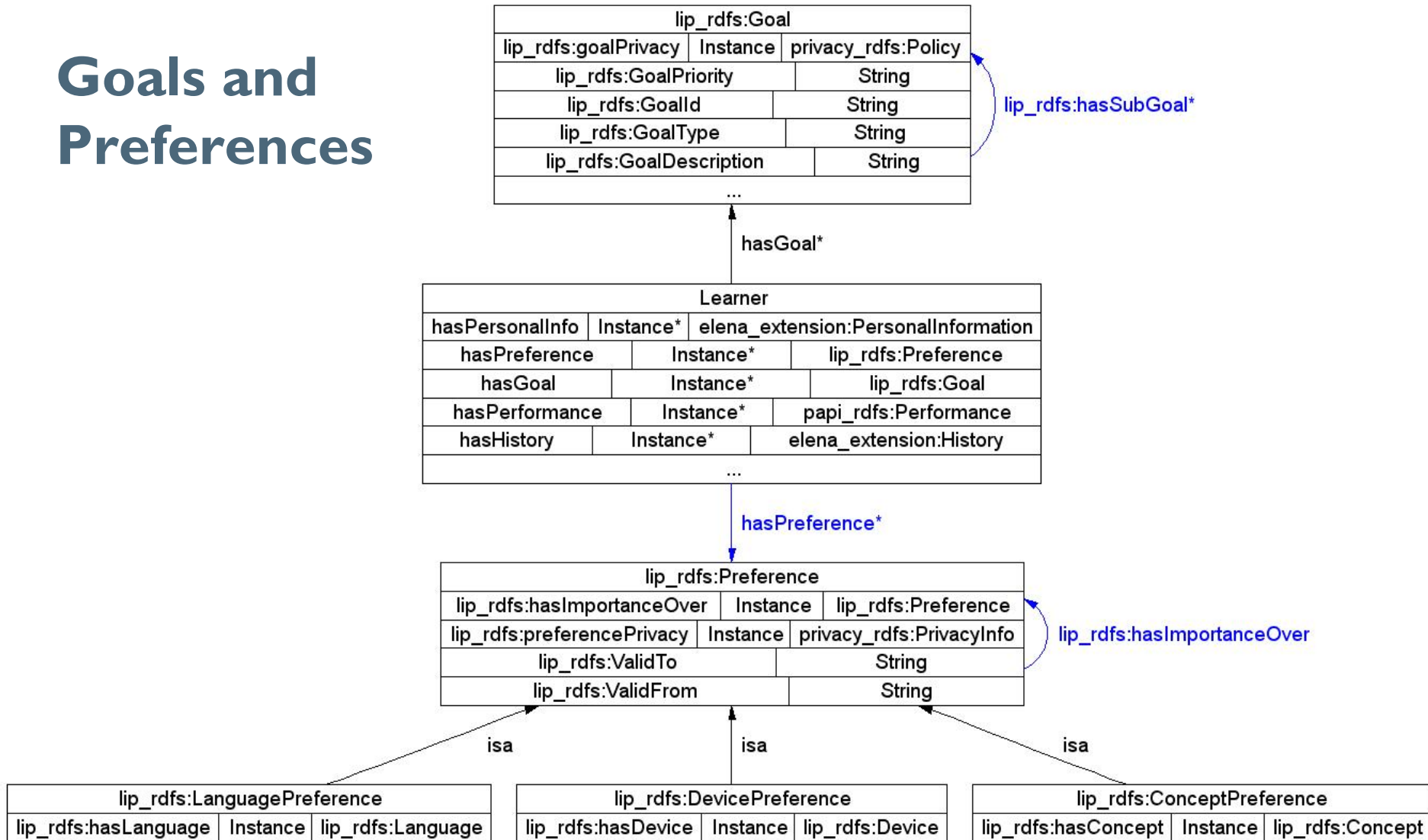
Competencies:RDCEO		
Competencies:isRequiredBy	Instance*	Competencies:RDCEO
Competencies:isEquivalent	Instance*	Competencies:RDCEO
Competencies:requires	Instance*	Competencies:RDCEO
Competencies:Catalog		String*
Competencies:hasVersion	Instance*	Competencies:RDCEO
Competencies:language		String
Competencies:Title		String
Competencies:hasPart	Instance*	Competencies:RDCEO
Competencies:Description		String*
Competencies:isVersionOf	Instance*	Competencies:RDCEO
Competencies:Entry		String
Competencies:isPartOf	Instance*	Competencies:RDCEO

Concept	
ConceptName	String

learning\_competency\*

learning\_competency\*

# Goals and Preferences



## Example: An Instance of a Learner Performance

```
student:student1[papi:performance -> student:performance_1].
  student:performance_bucket_1[papi:performance_bucket_value
    -> '10min'].
  student:performance_bucket_1[papi:performance_bucket_name
    -> 'time_on_task'].
  student:performance_1[papi:performance_bucket ->
    student:performance_bucket_1].
  student:performance_1[papi:performance_value -> '0.6'].
  student:performance_1[papi:performance_metric -> '0-1'].
  student:performance_1[papi:performance_coding ->
    'number'].
  student:performance_1[papi:granularity -> topic].
  student:performance_1[papi:learning_experience_identifier
    -> kbs:'Praedikatenlogik2.pdf'].
  student:performance_1[papi:learning_competency ->
    acm_ccs:'I.2.4.2.1'].
  student:performance_1[papi:issued_from_identifier ->
    kbs:'Test_Praedikatenlogik2.pdf'].
```

# Querying Metadata in Edutella

## Datalog- and RDF-Based QEL

Common internal data model for Queries

Several wrappers implemented (file based, relational database, concept base, ...) to support several metadata storage types

Two kinds of wrappers:

- Implementing provision service
- Implementing consumer (query) service



## Example: Edutella Query for Resources

```

<rdf:RDF
  xmlns:RDFNsId1='http://www.edutella.org/edutella#'
  xmlns:rdf='http://www.w3.org/1999/02/22-rdf-syntax-ns#'
  xmlns:rdfs='http://www.w3.org/2000/01/rdf-schema#'>
  <RDFNsId1:QEL3Query rdf:about='http://www.elena.org/gen#query'>
    <RDFNsId1:hasResultType
  rdf:resource='http://www.edutella.org/edutella#TupleResult' />
    <RDFNsId1:hasQueryLiteral>
  rdf:about="s(X, <dc:subject>, <java:variables>)."
  rdf:resource='http://www.edutella.org/edutella#Variable'
    rdfs:label='Resource' />
    <rdf:predicate
  rdf:resource='http://purl.org/dc/elements/1.1/subject' />
    <rdf:object rdf:resource='http://hoersaal.kbs.uni-
  hannover.de/rdf/java_ontology.rdf#Variables' />
    </RDFNsId1:RDFReifiedStatement>
  </RDFNsId1:QEL3Query>
</rdf:RDF>

```

## Adding Restriction on Language

```

<rdf:Description rdf:about="&n4;genid0">
  <n1:type
    rdf:resource="&n4:PDFReifiedStatement" />
</rdf:Description>
<rdf:Description rdf:about="&n4;genid0">
  <n1:supports(X, <dc:subject>, <java:variables>),
  <n1:supports(X, <dc:language>, <lang:de>).
  <n1:supports(X, <dc:language>, <lang:de>) />
</rdf:Description>
<rdf:Description rdf:about="&n4;genid0">
  <n1:predicate rdf:resource="&n3;language" />
</rdf:Description>
<rdf:Description rdf:about="&n4;genid0">
  <n1:object rdf:resource="&n7;de" />
</rdf:Description>

```

## A Rule for Adding Such Restriction

```

FORALL QUERY, VAR, PRED, OBJ, NEWLIT
  QUERY[edu:hasQueryLiteral -> edu:NEWLIT] AND
    edu:NEWLIT[rdf:type ->
edu:RDFReifiedStatement;
      rdf:subject -> VAR; rdf:predicate ->
PRED; rdf:object -> OBJ]
<- EXISTS LITERAL, ANY (QUERY[rdf:type ->
edu:QEL3Query;edu:hasQueryLiteral -> LITERAL]
AND
      LITERAL[rdf:type ->
edu:RDFReifiedStatement;
      rdf:subject -> VAR[rdf:type ->
edu:Variable]; rdf:predicate -> dc:ANY] )
      AND EXISTS A
      A[rdf:type ->
edu:AddSimpleRestriction;
      rdf:predicate -> PRED;
      rdf:object -> OBJ]@PP
      AND unify(NEWLIT, lit(VAR, PRED, OBJ)).
  
```

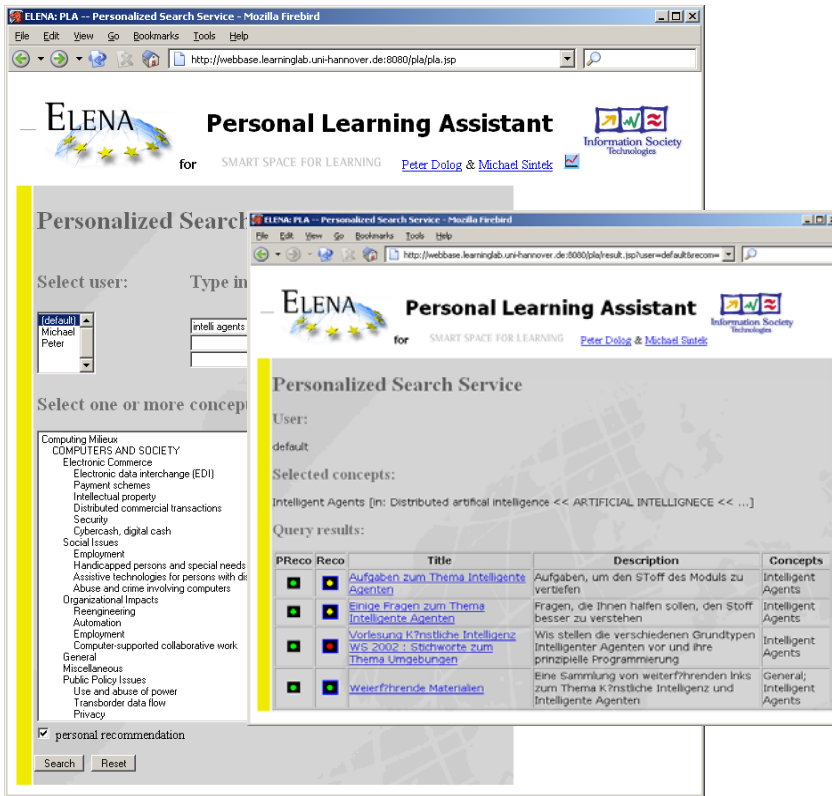
## A Rule to Generate Recommendation Annotation on Results

```

FORALL U, D recommended(U, D) <- user(U) AND
  document(D) AND
    FORALL D1 (prereq(D, D1) ->
      (FORALL T (topic(D1, T) ->
        (EXISTS P
          (U[papi:performance-
            >P]@uli:learner -> P[papi:learning_competency-
            >T]@uli:learner)) AND EXISTS D (prereq(D,
            D1)))))).
  
```

Extending the Knowledge Structure of the Resource by at Least Additional Attribute => D[hasAnnotation->recommended].

# Recommendation in the Search Results



Mapping the value of the hasAnnotation attribute to a visual representation

hasAnnotation -> recommended => GreenBall

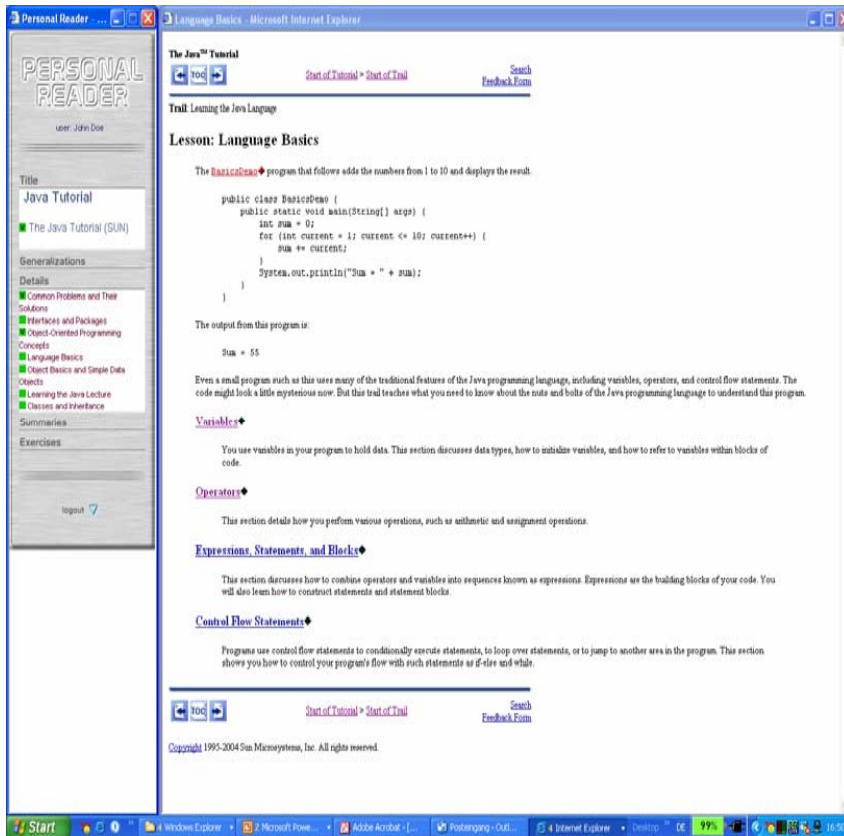
hasAnnotation -> not\_recommended => RedBall

...

## Example: A Rule for Generating Examples for Presented Learning Material

```
FORALL R, E example(R,E) <-  
  LearningResource(R) AND example(E) AND  
  EXISTS C1 (R[dc:subject->C1]) AND  
  FORALL C2 (R[dc:subject->C2]  
    -> E[dc:subject->C2]).
```

# The Personal Reader

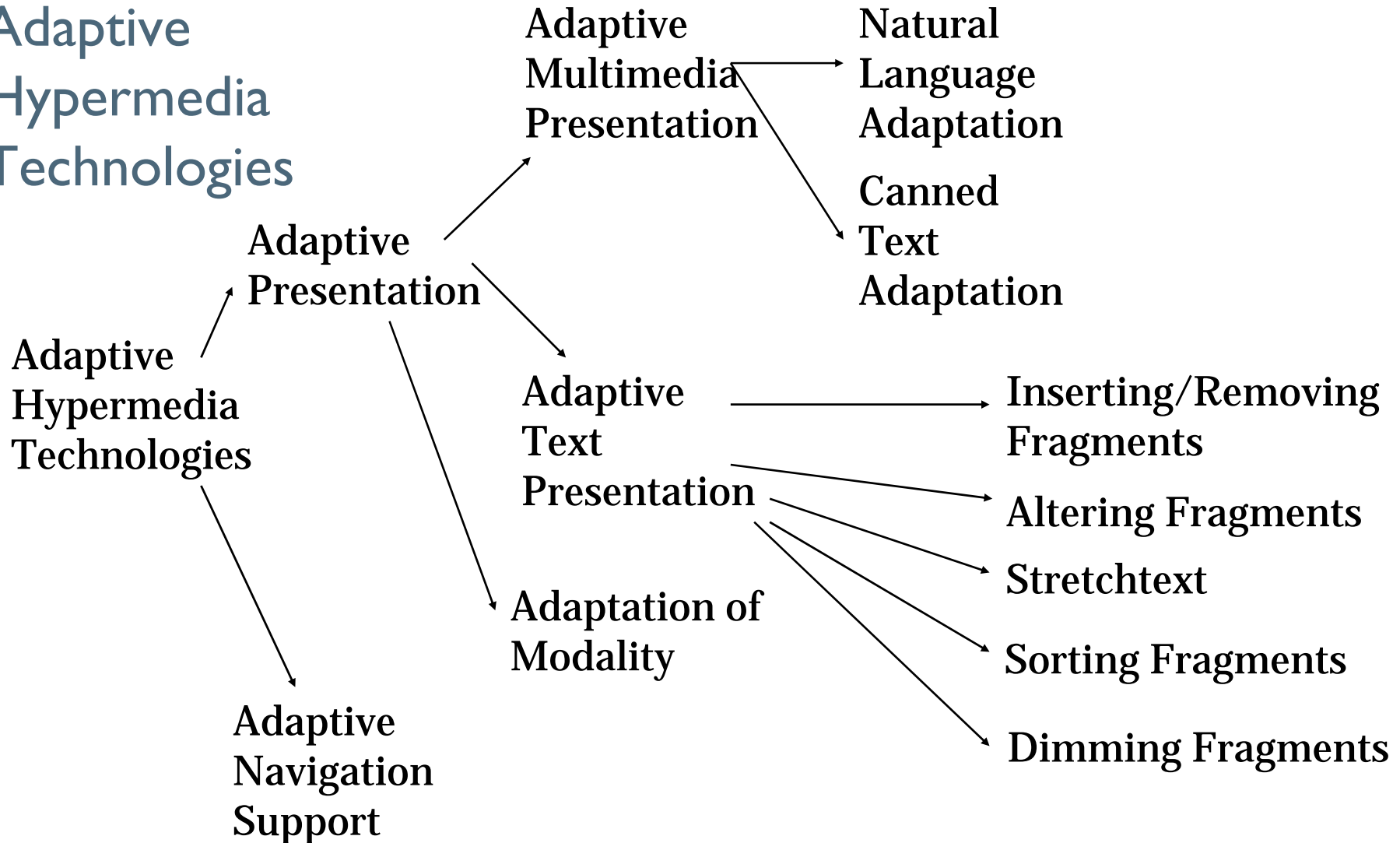


Similarly to the Example Rule, Summaries, Details, Generalizations, and Exercises are generated

Mapping to Visual Representation as Separate Boxes

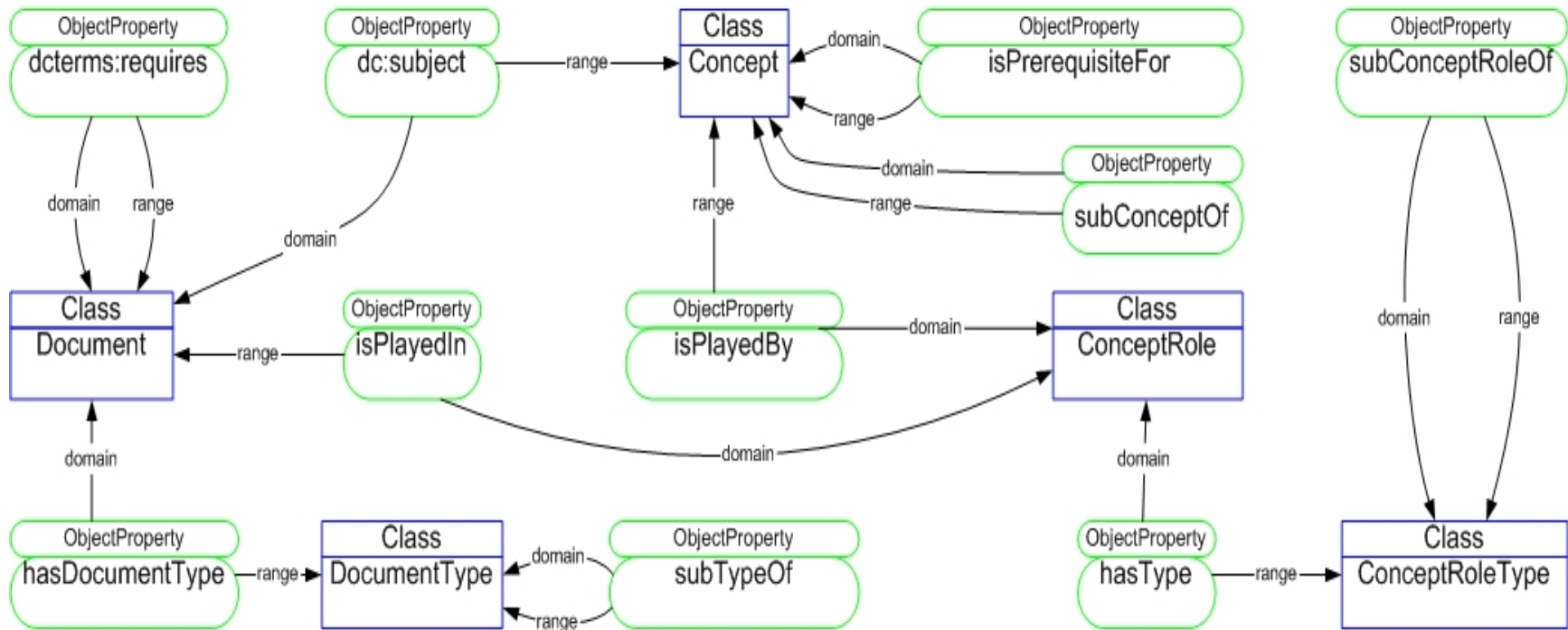
www.personal-reader.de

# Adaptive Hypermedia Technologies



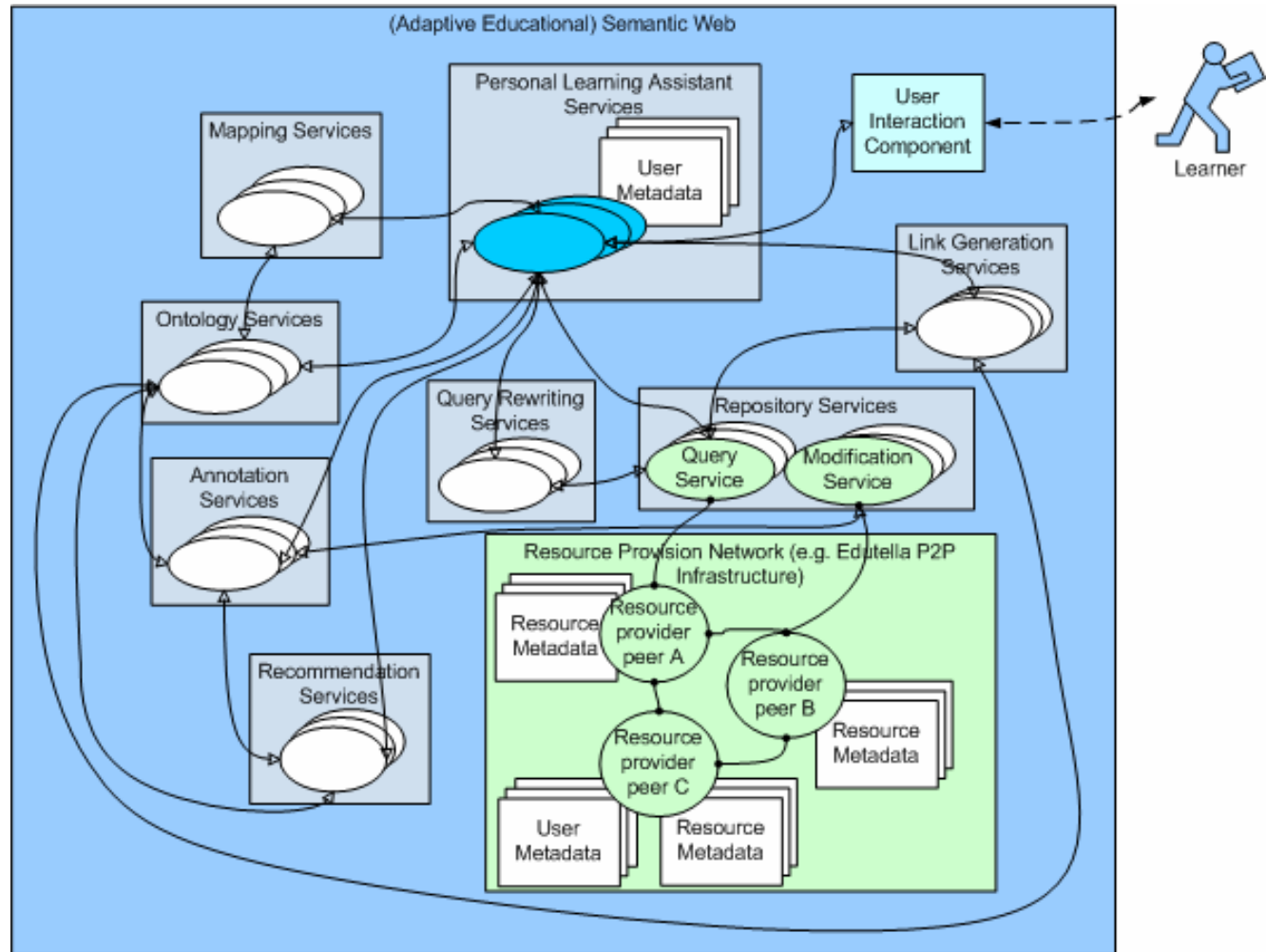


# Roles of Concepts in a Resource





# The technical approach



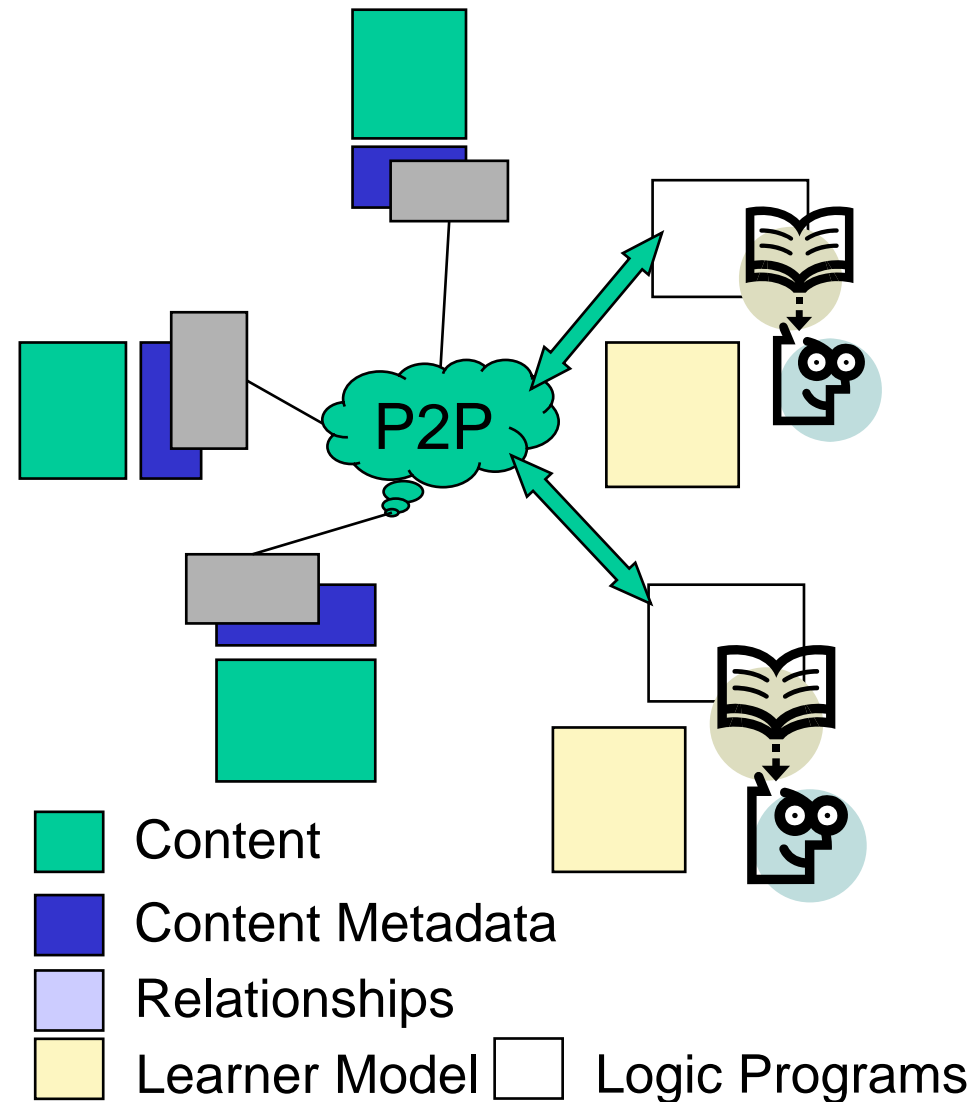
# Retrieving Resources

Distributed content  
 Distributed standard based  
 metadata descriptions about:

- Content
- Relationships between the content

Logic Programs

- Learner
- Query and adapt content delivery and its links
- Visualize adaptive navigation support



http://www.hcd-online.com

Search results are currently collected. Next update in 2 seconds.

Currently used search-term(s): **economy**

Select	Relevance	Title / Description	Remote service status:		
<input type="radio"/>	100. (1)	<b>Change-Management und Innovation</b> Die Zukunft (die sogenannte □Next Economy□) ist eine Innovations□Economy. Nur wer sich in Zukunft auf Ver□nderungen einstellt, wer hohe Innovationsraten verwirklichen kann, wird am Markt bestehen. Ein ...	Executive Academy (WBZ): ✓	LASON: ✗	EduSource: ✓
<input type="radio"/>	2.70 (2)	<b>The Experience Economy: Work Is Theatre &amp; Every Business a Stage</b> Availability: Usually ships in 24 hours	EduNext-UPM: ✗	Edutella: ✗	Seminarshop.com: ✓
<input type="radio"/>	2.70 (3)	<b>Book of Common Prayer (1979, Personal Size Economy, Black)</b> Availability: Usually ships in 24 hours	CLIX: ✗	ULI: ✗	Knowledgebay: ✗
<input type="radio"/>	2.70 (4)	<b>Illicit : How Smugglers, Traffickers and Copycats are Hijacking the Global Economy</b> Availability: Usually ships in 24 hours	Metzingen VHS-Kursdatenbank: ✓	Amazon: ✓	bfi-vienna: ✗
<input type="radio"/>	2.70 (5)	<b>Basic Economics: A Citizens Guide to the Economy, Revised and Expanded</b> Availability: Usually ships in 24 hours	Yes	Amazon	English
<input type="radio"/>	2.70 (6)	<b>Twilight in the Desert: The Coming Saudi Oil Shock and the World Economy</b> Availability: Usually ships in 24 hours	Yes	Amazon	English
<input type="radio"/>	2.70 (7)	<b>The Macro Economy Today with DiscoverEcon with Solman Videos</b> Availability: Usually ships in 2 to 5 weeks	Yes	Amazon	English
<input type="radio"/>	2.36 (8)	<b>The Travels of a T-Shirt in the Global Economy : An Economist Examines the Markets, Power, and Politics of World Trade</b> Availability: Usually ships in 24 hours	Yes	Amazon	English
<input type="radio"/>	2.02 (9)	<b>How We Compete : What Companies Around the World Are Doing to Make it in Today's Global Economy</b> Availability: Usually ships in 24 hours	Yes	Amazon	English
<input type="radio"/>	2.02 (10)	<b>The Wal-Mart Effect : How the World's Most Powerful Company Really Works--and How It's Transforming the American Economy</b> Availability: Usually ships in 24 hours	Yes	Amazon	English
<input type="radio"/>	1.88 (11)	<b>3043 Advanced Novell Network Administration NetWare 6.5</b> NetWare 6.x wurde speziell auf die Bed□rfnisse der heutigen Net Economy zugeschnitten. NetWare 6.x kann in bestehenden Netzwerken eingesetzt werden, um diese in ein einziges, alles umfassendes Netz - ...	Yes	Seminarshop.com	German
<input type="radio"/>	0.0 (12)	<b>China Reise Taijiqian Qi Gong</b> 21 Tage China Reise - Taijiqian / Qi Gong Unterricht an der Sportuniversit□t Peking, Rundreise zu faszinierenden St□tten der chinesischen Kultur	Yes	Seminarshop.com	German
<input type="radio"/>	0.0 (13)	<b>Szenario-Technik</b> Jeder Unternehmer, jede F□hrungskraft ist t□glich immer wieder neu mit der Frage konfrontiert□- Wie k□nnte mein Unternehmen/mein Bereich in ca. 1-3 Jahren aussehen?- Welche Anforderungen k□nnte der Ku ...	Yes	Seminarshop.com	German
<input type="radio"/>	0.0 (14)	<b>The Wisdom of Crowds: Why the Many Are Smarter Than the Few and How Collective Wisdom Shapes Business, Economies, Societies and Nations</b>	Yes	Amazon	English

# Semantic Annotation

Annotator is activated from repository administration interface (for all or only new resources)

Loads (linguistically annotated) ontology/ontologies that can be used to annotate this repository

Loads textual parts (title, description, key words, content if available) of resources and stores them in full-text (Lucene) index

Finds (new) annotations

- Linguistic expressions of ontology are used as queries against full-text index to find (new) annotations
- Text classification techniques are used to find additional annotations (e.g., use combined and pruned term frequency vectors of all resources of one concept as new query)

Sends new annotations back to repository administration interface where user checks correctness

# Technological Issues

Exact Match – not always work – similarity measures considered already in Personal Reader, more doc. Analysis in HCD-Suite online

Heterogeneity (inconsistencies, contradictions)

Ordering

Opposite situation – not to many results/links but to few

Performance

## Questions?

Additional References to those at the course web site:

Peter Dolog et. al: Personalization in Distributed e-Learning Environments. In Proc. WWW2004. New York.

Peter Dolog et. al: The Personal Reader: Personalizing and Enriching Learning Resources using Semantic Web Technologies. In Proc. AH2004. Eindhoven

Peter Dolog and Wolfgang Nejdl: Semantic Web Technologies for the Adaptive Web. In Peter Brusilovsky, Alfred Kobsa, Wolfgang Nejdl (eds.), *The Adaptive Web: Methods and Strategies of Web Personalization*. To appear.