Learning as Navigation in an Ontology Based Knowledge Basis

TIES 2012

Theme 6: „Creation and use of digital content“

Stefan Iske
Juniorprofessor for Instructional Media and Media Education
Faculty of Human Sciences
University of Cologne
Germany

Norbert Meder
Professor for General and Systematical Pedagogy
Faculty of Educational Sciences
University of Duisburg-Essen
Germany
how to structure?
an online learning environment
in order to support learning processes

how to analyse?
learning processes
within such a structured environment
how to structure?

hypertext + didactical ontology

how to analyse?

navigational path as sequence by means of optimal-matching
hypertextual environment

- **modules and links**
  - de-contextualisation
  - re-contextualisation

- **characteristics**
  - nonlinear network
  - no predefined path

- how to de-/re-contextualise in order to support learning?
metadata: didactical ontology
**overview: didactical ontology**

<table>
<thead>
<tr>
<th>Category</th>
<th>Receptive knowledge items</th>
<th>Interactive knowledge items</th>
<th>Cooperative knowledge items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject category</td>
<td></td>
<td>Three or multi-stage thesaurus</td>
<td></td>
</tr>
<tr>
<td>Competence category</td>
<td></td>
<td>Degree of difficulty and description of activity or role</td>
<td></td>
</tr>
<tr>
<td>Media category</td>
<td>Presentation media</td>
<td>Interactive media</td>
<td>Communication media</td>
</tr>
<tr>
<td>Knowledge category</td>
<td>Type of knowledge (answers to questions)</td>
<td>Type of assignment (filling in gaps)</td>
<td>Forms of cooperation (knowledge communication)</td>
</tr>
<tr>
<td>Relational category</td>
<td>Subject relations between the learning units and didactic relations between the knowledge items</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
example: didactical ontology
example: didactical ontology

in accordance with DIN Norm Thesauri
example: didactical ontology
example: didactical ontology
... a lot of work... why?

• provide
  – *multiple and divers approaches* to specific subject; learning strategies
  – *transparent, intentional* navigation
  – *individualized, self-directed* learning
  – confirm to *complexity* of didactic discourse

• *evaluation* approves
  empirical value of didactical ontology
evaluation of didactical ontology

• how to evaluate *individualized, self-directed* learning
  focus on *process*

  • navigational *paths* as sequences of visited web-pages
    (reconstructed by log files)
  
  • *quantitative analysis:*
    comparing sequences with regard to similarity
    (by means of *optimal-matching*)

  • cluster of *similar sequences*

• navigational path as *index* for learning strategies
  based on didactical ontology,
  *reconstruction* of learning strategies
**dataset**

- **navigation** in (didactical) ontology based learning environment
- **access over internet:**
  no further information (intention, success, efficiency, satisfaction... )
  - **1500 learning sequences**, containing 4700 informational units
- **ca. 450 users**
  - average number of elements / sequences: 4.2
  - number of elements varies from 1 to 24
  - in general: combinations of 7 distinct elements (pages)
navigational patterns
results: navigational patterns

- directed navigation ('looking up')
  (here: task-oriented)
- linear navigation: layout-oriented
- explanation-oriented
- example-oriented
- recursive navigation ('deepening')
Conclusions

- **plurality** of navigational sequences, containing: *patterns / strategies*

- didactical ontology based environment supports
  - *individualised / self-directed learning*
    as different approaches to knowledge

- analysis of *learning strategies* by means of optimal-matching (focus on *process*)

- **highly effective**
  BUT: effort to prepare environment
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stefan.iske@uni-koeln.de
norbert.meder@uni-due.de

thank you!
Didactical Ontology / Web-Didaktik


Evaluation / Navigational Analysis


