Master thesis

INTERACTION SYSTEM FOR A MOOC SEARCH ENGINE

Design, implementation and summative empirical evaluation of the User Interface
AGENDA

1. Vision
2. Outline
3. Conception
4. Implementation
5. Evaluation
   5.1. Lab and field study
   5.2. General statistics
   5.3. Application usage
   5.4. “Go to course” button (outclicks)
   5.5. Overall Results
6. Future Work
7. System Demo
Improving teaching and learning at the university by providing students with an intelligent vertical search engine for MOOCs

→ Finding the right online courses
→ Extending knowledge and closing subject-related gaps
→ Succeeding in studies
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MOOC search web application

- based on search and recommendation engines in IROM¹

¹ http://iorom.pms.ifi.lmu.de/
MOOC search web application

→ based on search and recommendation engines in IROM

1 http://irom.pms.ifi.lmu.de/
MOOC search web application

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MOOC search web application

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Extensive evaluation: Heuristic & empirical

Full-stack implementation and user data collection

Functionality and layout conception

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3. CONCEPTION

1) Web App Client (Angular 2)
   - Search results

2) Backend Server (Play Framework)
   - Other app data
   - Metadata

3) Search & Recommendation
   - Fulltext search engine
     - Apache Solr (boolean retrieval)
   - Recommendation
     - Cluster-based Similarity
   - Rank 1 Recommendation
     - Average Word2Vec
   - Rank 2 Recommendation
     - Sequence-To-Sequence Autoencoder

4) Database (MongoDB)
   - REST API communication
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4. IMPLEMENTATION

Homepage

https://irom.pms.ifi.lmu.de/
4. IMPLEMENTATION

Search engine results page (SERP)

https://irom.pms.ifi.lmu.de/#/search?searchQuery=business
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5. EVALUATION

5.1. Lab & field study

Heuristic lab study

Empirical field study
5. EVALUATION

5.1. Lab & field study

Heuristic lab study

- 5 participants

Procedure:
- Thinking aloud
- Observe user behavior
- Interview

Results:
- Detailed insights in user behavior
- A lot of valuable feedback
- Different individual opinions

Empirical field study
5. EVALUATION

5.1. Lab & field study

**Heuristic lab study**
- 5 participants
- Procedure:
  - Thinking aloud
  - Observe user behavior
  - Interview
- Results:
  - Detailed insights in user behavior
  - A lot of valuable feedback
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**Empirical field study**
- 56 participants
- Procedure:
  - Registration
  - Let users explore platform
  - Tracking with Piwik
- Results:
  - Only few registrations, but many visitors
  - Enough data for a first analysis
  - Almost all functions were used
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5.2. General statistics

![Platform Visits Diagram]

**Platform Visits**

Option: IROM DB

- Per year (expected): 7227
- 10 day study: 198

Option: Piwik

- Per year (expected): 3906
- 10 day study: 107

**Number of visits**
5. EVALUATION
5.2. General statistics

![Platform visits chart]

- **Data source**: IROM DB, Piwik
- **Number of visits**:
  - IROM DB: Expected: 7227, 10 day study: 198
  - Piwik: Expected: 4636, 10 day study: 107

![Searches and course views chart]

- **Per year (expected)**, **10 day study**
  - **Course views**: Expected: 4636, 10 day study: 127
  - **Search queries**: Expected: 2592, 10 day study: 71
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5.3. Application usage

![Graph showing visits and time spent on platform](image)

- **Number of visits**
- **Average time spent on platform (min)**

Number of visited subpages:
- 0 to 3
- 4 to 6
- 7 to 10
- 11 to 16
- 19 to 29
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5.4. ”Go to course” button (outclicks)

<table>
<thead>
<tr>
<th></th>
<th>without outclick</th>
<th>with outclick</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platform visit</td>
<td>![without outclick]</td>
<td>![with outclick]</td>
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59,5 % | 40,5 %
5. EVALUATION

5.4. ”Go to course” button (outclicks)

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<td><img src="image1" alt="Platform visit without outclick" /></td>
<td><img src="image2" alt="Platform visit with outclick" /></td>
</tr>
<tr>
<td>Course detail view</td>
<td><img src="image3" alt="Course detail view without outclick" /></td>
<td><img src="image4" alt="Course detail view with outclick" /></td>
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59.5%  40.5%

64.6%  35.4%
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Search Results Pages

- Scanned randomly
- Clicks not heavily concentrated on position 1 & 2

⇒ Intention to encourage exploration works
5. EVALUATION

5.5. Overall results

Search Results Pages

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- Intention to encourage exploration works

Course detail page

- More information desired
- “Go to course” button:
  - Lab study: eye-catching, clear
  - Field study: in 40% of visits used, rather extensively
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Recommendations

- Useful and interesting
- In >40% of visits viewed, half clicked

→ Good quality, encouraged exploration

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Login
- Features clear and useful, but not enough for effort to log in
- In field study not used at all
  ➤ Enhancement of features needed
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Search features

- Auto-completion / correction
- Partial matches, scoped search (filters and categories)
- Enhanced structure of result pages through category grouping / labeling
6. FUTURE WORK

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**Login features**
- Encouragement through hints (for viewed and saved courses)
- More personal features:
  - finished courses
  - status of courses enrolled in
  - notifications
- Native login
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**„About“ page**
- Understanding of MOOC domain
- Platform purpose / functionality
- Benefits of login
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**Social activity**
- Tags for search improvement
- Difficulty and quality rating
- Comments
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**Mobile app**
- More comfortable
- Additional features (e.g. push notifications)
- Greater popularity of platform and more trust
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http://ami.responsiveisdesign.is/
FREQUENCY OF CHOSEN SEARCH RESULT POSITIONS

desktop • mobile

above the fold

Number of course views after search

Course position on SERP