Personalized Links Recommendation Based on Learning Analytics in MOOCs

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Agenda

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- Related Work
- Research Problem
- RECOMMENDER SYSTEM Design
- Requirements
- Implementation
  - System Architecture
  - Case Study
- Evaluation
- Conclusion
  - Future Work
Introduction

- **Video-Based Learning (VBL)** has a long history in the educational design research.

- In the past decade, the interest in VBL has increased as a result of new forms of online education, such as **flipped classrooms**, and most prominently **MOOCs**.

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Challenges

Thus, research is needed to investigate different approaches of user recommendation in MOOCs. This work proposes a novel approach which applies recommender system techniques for video lectures and discussions forum in MOOCs.
The contributions of this work are these design requirements:

- Capture and store large data sets from learners’ activities when they watched video lecture.
- Observing the items that a user views the video lectures.
- Keeping a record of the items that a user discusses in the forum and newsgroup articles.
- Analyzing the user's social network and discovering similar likes and dislikes “Only for MOOC lectures”.
- Provide a recommendation mechanism that enables learners to discover external video lecture and learning resources based on their interests and activities on the learning environment.

Personalized Links Recommendation Based on Learning Analytics in MOOCs
User Requirements

- Collect as much data as reasonably possible form the video timeline.
- Support for a wide variety of current and future mobile devices.
- The system must deal with privacy police of the university. The user must be aware about the fact that the application is running, that it is collecting data, or what data it is collecting.
System Architecture

[Diagram showing the process of personalized links recommendation based on learning analytics in MOOCs.]

MOOC Learning Material

Learner Behavior

Collect Row Data
Anonymous Profiles

Aggregation Similar Behaviors

Data Processing and Analysis

Recommendations

External Learning Material Recommendations
Case Study

Personalized Links Recommendation Based on Learning Analytics in MOOCs
Figure 3. Video Heatmap Analysis
Case Study

![Graph showing MOOC Forum Discussions and Analytics over video time line]

- **Comments** line starts at 5.2, drops to 2.5, then rises to 4.6, and finally stabilizes at 4.5.
- **Questions** line starts at 4, drops to 4, then rises to 3.8, and finally stabilizes at 4.

Personalized Links Recommendation Based on Learning Analytics in MOOCs
**Usability Evaluation: The System Usability Scale (SUS)**

<table>
<thead>
<tr>
<th>No</th>
<th>Item</th>
<th>User Rating</th>
<th>SUS Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I think that I would like to use this website frequently</td>
<td>4.3</td>
<td>3.3</td>
</tr>
<tr>
<td>2</td>
<td>I found the website unnecessarily complex</td>
<td>2.3</td>
<td>2.7</td>
</tr>
<tr>
<td>3</td>
<td>I thought the website was easy to use</td>
<td>3.9</td>
<td>2.9</td>
</tr>
<tr>
<td>4</td>
<td>I think that I would need the support of a technical person to be able to use this website</td>
<td>2.1</td>
<td>2.9</td>
</tr>
<tr>
<td>5</td>
<td>I found the various functions in this website were well integrated</td>
<td>4.6</td>
<td>3.6</td>
</tr>
<tr>
<td>6</td>
<td>I thought there was too much inconsistency in this website</td>
<td>1.9</td>
<td>3.1</td>
</tr>
<tr>
<td>7</td>
<td>I would imagine that most people would learn to use this website very quickly</td>
<td>4.6</td>
<td>3.6</td>
</tr>
<tr>
<td>8</td>
<td>I found the website very cumbersome to use</td>
<td>1.1</td>
<td>3.9</td>
</tr>
<tr>
<td>9</td>
<td>I felt very confident using the website</td>
<td>4.8</td>
<td>3.8</td>
</tr>
<tr>
<td>10</td>
<td>I needed to learn a lot of things before I could get going with this website</td>
<td>1.2</td>
<td>3.8</td>
</tr>
</tbody>
</table>

**SUS Total Score** | 84

*Personalized Links Recommendation Based on Learning Analytics in MOOCs*
<table>
<thead>
<tr>
<th>No</th>
<th>Item</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I think that I the system is able to provide specific recommendation for me</td>
<td>4.3</td>
<td>0.45</td>
</tr>
<tr>
<td>2</td>
<td>I thought the system is able to recommend me (four to five) relevant learning material.</td>
<td>4.3</td>
<td>0.73</td>
</tr>
<tr>
<td>3</td>
<td>The recommended learning material help me to better understand the course content.</td>
<td>4.1</td>
<td>0.91</td>
</tr>
<tr>
<td>4</td>
<td>I think that items recommended to me are diverse (Videos, PDF, Images).</td>
<td>3.45</td>
<td>1.20</td>
</tr>
<tr>
<td>5</td>
<td>I found the rating system (Likes) helps me to assess the quality of the learning material</td>
<td>4.6</td>
<td>0.62</td>
</tr>
<tr>
<td>6</td>
<td>I found it is too easy to obtain the recommended learning resources for me from OER.</td>
<td>3.9</td>
<td>1.13</td>
</tr>
<tr>
<td>7</td>
<td>The personalized links recommendation helps me to reflect on my own performance.</td>
<td>4.6</td>
<td>0.61</td>
</tr>
<tr>
<td>8</td>
<td>I found the system is very respect of my privacy.</td>
<td>4.6</td>
<td>0.34</td>
</tr>
<tr>
<td>9</td>
<td>I think the discussions forum helps me to improve collaboration with peers.</td>
<td>4.8</td>
<td>3.8</td>
</tr>
<tr>
<td>10</td>
<td>I can get help at any point that is tailored to where is me.</td>
<td>4.2</td>
<td>0.82</td>
</tr>
<tr>
<td></td>
<td>Effectiveness Evaluation Average Score</td>
<td>4.28</td>
<td>1.06</td>
</tr>
</tbody>
</table>
The aim of this research was to explore and explain the personalized links recommendation tool in MOOCs. According to the case study results, responses regarding recommendation provided through this tool were largely positive. However, some learners received only recommended videos. One possible reason for this is that, those participants didn’t participate in the discussion forum or students news group.
Future work

Enhancing MOOC Platforms through learning analytics
Thank you!

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