Learning from Large-scale Learning Analytics

Claudia Hauff
Web Information Systems, TU Delft
chauff.github.io
By the end of 2015 (world-wide)

- 4,000 Massive Open Online Courses (MOOCs)
- 35 million enrolments
- 440,000 enrolments in a single MOOC
- **Engagement**: few learners engage deeply
- **Retention**: less than 7% of learners complete a course
Research landscape

Survey of 126 papers with controlled trials of scalable teaching strategies.

Large-scale learning environments are not yet at the forefront of research.
Research landscape

Survey of 126 papers with controlled trials of scalable teaching strategies.

The majority of results in MOOC environments are null findings.
From learners to earners

Learners: explorers or conformers?

The testing effect: observable in MOOCs?

Real-time attention tracking
Are MOOC learners able to solve **real-world paid tasks** from an online work platform with sufficient **accuracy** and **quality**?

<table>
<thead>
<tr>
<th>Week</th>
<th># Active learners</th>
<th># Bonus (% from active)</th>
<th>Task payment</th>
<th># Accurate (% of active)</th>
<th># High quality (% of accurate)</th>
<th>Coverage (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>13,719</td>
<td>2,145 (15.64%)</td>
<td>$25</td>
<td>1,731 (80.70%)</td>
<td>1,230 (71.06%)</td>
<td>0.88 (0.32)</td>
</tr>
<tr>
<td>2</td>
<td>8,228</td>
<td>594 (7.22%)</td>
<td>$50</td>
<td>227 (38.22%)</td>
<td>87 (38.33%)</td>
<td>0.91 (0.27)</td>
</tr>
<tr>
<td>3</td>
<td>5,825</td>
<td>390 (6.70%)</td>
<td>$20</td>
<td>44 (11.28%)</td>
<td>28 (63.64%)</td>
<td>0.54 (0.32)</td>
</tr>
<tr>
<td>4</td>
<td>4,270</td>
<td>414 (9.70%)</td>
<td>$35</td>
<td>354 (85.51%)</td>
<td>296 (83.62%)</td>
<td>0.95 (0.22)</td>
</tr>
<tr>
<td>5</td>
<td>3,709</td>
<td>231 (6.23%)</td>
<td>$20</td>
<td>39 (16.88%)</td>
<td>16 (41.03%)</td>
<td>0.69 (0.24)</td>
</tr>
<tr>
<td>7</td>
<td>3,059</td>
<td>38 (1.24%)</td>
<td>$35</td>
<td>26 (68.42%)</td>
<td>25 (96.15%)</td>
<td>0.73 (0.68)</td>
</tr>
</tbody>
</table>

Built a working recommender system.

Deployed in our MOOCs.
Learners: explorers or conformers?

To what extent do learners adhere to a MOOC’s prescribed learning path?

113,000 learners across 4 MOOCs

Exploration through visualization and motif clustering

The testing effect - observable in MOOCs?

How does an adaptive retrieval practice system affect learners' achievement and self-regulation?

1,047 learners in a randomized controlled trial

qCard: question the learner answered already (they pop up at random intervals)

Only engagement differs between passers/non-passers.

Real-time attention tracking

Are the technological capabilities of MOOC learners’ hardware sufficient? Do MOOC learners accept such intervention? Do MOOC learners adapt their behaviour?

>800 participants in a single MOOC

78% of MOC learners fulfil the hardware requirements.

31% of MOOC learners accept privacy-aware webcam-based tracking as an assistive tool.

High level of inattention: on average once every 36 seconds.
Overall

MOOC platforms offer a large and heterogeneous playground for empirical work.

MOOC learners are difficult to engage.

The huge gap between MOOC enrolment and MOOC completion remains.

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