RETRIEVAL PRACTICE & STUDY PLANNING IN MOOCS:
EXPLORING CLASSROOM-BASED SELF-REGULATED LEARNING STRATEGIES AT SCALE

TU DELFT
WEB INFORMATION SYSTEMS GROUP, LAMBDA LAB
DAN DAVIS · GUANLIANG CHEN · TIM VAN DER ZEE ·
CLAUDIA HAUFF · GEERT-JAN HOuben
OUR GOALS

1. Gain actionable insights into learner behaviors at scale
2. Increase our knowledge about learners by looking beyond the learning platform
3. Design and implement interventions that enable adaptive learning at scale
PROBLEM

- MOOC learners lack the self-regulatory skills necessary to succeed
- This leads to the problem of massive attrition

SOLUTION

- Apply empirically-backed theory from the learning sciences
- Translate traditional classroom approaches into an edX MOOC environment
RETRIEVAL PRACTICE
actively recalling information from memory
STUDY PLANNING
STUDY PLANNING

thinking about, explicitly stating, and reflecting on goals
both are effective in traditional classrooms

reflecting on goals

thinking about, explicitly stating, and

thinking about, explicitly stating, and
BOTH ARE EFFECTIVE IN TRADITIONAL CLASSROOMS

thinking about, explicitly stating, and

(HOW) DO THEY TRANSLATE TO MOOCS?
RESEARCH QUESTIONS & HYPOTHESES
RQ1
Do learners engage with SRL interventions as much as they do with course content (videos, quizzes, etc.)?
RQ1

Do learners engage with SRL interventions as much as they do with course content (videos, quizzes, etc.)?

Learners do not engage with the SRL interventions as much as they engage with the main course content, such as videos and quizzes.

H1

Learners do not engage with the SRL interventions as much as they engage with the main course content, such as videos and quizzes.
RQ2

Does inserting retrieval cues after MOOC lecture videos increase test performance?
RQ2

Does inserting retrieval cues after MOOC lecture videos increase test performance?

Actively retrieving/producing knowledge leads to better exam scores than passive rereading.

H2
RQ3
Does providing a scaffolded means of study planning promote learner engagement and self-regulation?
RQ3

Does providing a scaffolded means of study planning promote learner engagement and self-regulation?

H3

Encouraging learners to actively plan and reflect on their study habits will increase their engagement with the course.
**H3**

Encouraging learners to actively plan and reflect on their study habits will increase their engagement with the course.

**H4**

Learners who **actually** plan and reflect on their course of study will exhibit higher engagement and achievement.
EXPERIMENTAL SETUP
<table>
<thead>
<tr>
<th>MOOC</th>
<th>Strategy</th>
<th>Enrolled</th>
<th>Pass Rate</th>
<th>Study Participants</th>
<th>Cohorts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional Programming</td>
<td>Retrieval</td>
<td>27,884</td>
<td>5.05%</td>
<td>9,836</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Practice</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial Biotechnology</td>
<td>Study</td>
<td>11,042</td>
<td>4.08%</td>
<td>1,963</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Planning</td>
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STUDY PLANNING

simple A/B

half receive study planning module; half don’t
In the space below, please describe, in detail, your study plan and desired learning objectives for the week regarding your progress:

- I plan to watch all of the lecture videos.
- I will write down questions I have about the videos or assignments and discuss them in the forum.
How closely did you follow your study plan from the beginning of the week?

Did you successfully meet all of your learning objectives?

In the space below, explain how you can improve upon your study habits in the following weeks in order to meet your goals.
How closely did you follow your study plan from the beginning of the week? Did you successfully meet all of your learning objectives? In the space below, explain how you can improve upon your study habits in the following weeks in order to meet your goals.
RETRIEVAL PRACTICE

Control: receive no treatment
Given: provided summary written by us
Cued: prompted to write summary (retrieval cue)
Putting a function name between single back quotes turns it into a infix operator. GHCi does not automatically detect changes in scripts, one must execute the reload command before using newly added definitions. Types begin with uppercase letters; function and argument names begin with lowercase letters. Whitespaces are significant in Haskell (layout rule).

GIVEN
Please respond in 3-5 sentences to the following question: ‘In your opinion, what are the most important points from the previous video?’
Please respond in 3-5 sentences to the following question:
“In your opinion, what are the most important points from the previous video?”
RESULTS
RQ1
Do learners engage with SRL interventions as much as they do with course content (videos, quizzes, etc.)?

H1
Learners do not engage with the SRL interventions as much as they engage with the main course content, such as videos and quizzes.
Do learners engage with SRL interventions as much as they do with course content (videos, quizzes, etc.)?

Learners do not engage with the SRL interventions as much as they engage with the main course content, such as videos and quizzes [1,7].

22% of active learners clicked on a retrieval cue.
RQ1
Do learners engage with SRL interventions as much as they do with course content (videos, quizzes, etc.)?

Learners do not engage with the SRL interventions as much as they engage with the main course content, such as videos and quizzes [1,7].

H1
14% of active* learners clicked on a study planning module.

*Active learners are those who have engaged with the course content.
**RQ2**
Does inserting retrieval cues after MOOC lecture videos increase test performance?

**H2**
Actively retrieving/producing knowledge leads to better exam scores than passive rereading.
RQ2
Does inserting retrieval cues after MOOC lecture videos increase test performance?

Actively retrieving/producing knowledge leads to better exam scores than passive rereading [4,5,16].

H2
Functional Programming Grades By Group

Density

Final Grade

Given
Control
Engaged w/ Prompt
RQ2: Does inserting retrieval cues after MOOC lecture videos increase test performance?

Actively retrieving/producing knowledge leads to better exam scores than passive rereading [4,5,16].

**Functiona**

**Programming Grades By Group**

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<th>Control</th>
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**NO SIGNIFICANT DIFFERENCES**
**RQ3**

Does providing a scaffolded means of study planning promote learner engagement and self-regulation?

**H3**

**Encouraging** learners to actively plan and reflect on their study habits will increase their engagement with the course.
RQ3

Does providing a scaffolded means of study planning promote learner engagement and self-regulation?

Encouraging learners to actively plan and reflect on their study habits will increase their engagement with the course. [11,17].

INTENTION TO TREAT (ITT):
NO SIGNIFICANT DIFFERENCES
RQ3
Does providing a scaffolded means of study planning promote learner engagement and self-regulation?

H4
Learners who actually plan and reflect on their course of study will exhibit higher engagement and achievement.
RQ3

Does providing a scaffolded means of study planning promote learner engagement and self-regulation?

Learners who actually plan and reflect on their course of study will exhibit higher engagement and achievement. [17,23]

STUDY PLANNERS:
SIGNIFICANT DIFFERENCES

- **FINAL GRADE**
- **PERSISTENCE**
- **SESSION COUNT**
- **TIME IN COURSE**
RQ3 Does providing a scaffolded means of study planning promote learner engagement and self-regulation?

Learners who actually plan and reflect on their course of study will exhibit higher engagement and achievement. [17,23]

STUDY PLANNERS: SIGNIFICANT DIFFERENCES

- **FINAL GRADE**  \( \bar{x} = 46.42 \, // \, 36.44 \)
- **PERSISTENCE**  \( \bar{x} = 4.6 \, // \, 3.8 \)
- **SESSION COUNT**  med = 25 // 19
- **TIME IN COURSE**  med = 18.6 // 13.1
1. Theory isn’t enough

2. It must be activated with engaging interfaces

3. Small interventions lead to small results