RETRIEVAL PRACTICE & STUDY PLANNING IN MOOCS:

EXPLORING CLASSROOM-BASED SELF-REGULATED LEARNING STRATEGIES AT SCALE

TU DELFT

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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

Kizilcec, R.F., Perez-Sanagustın, M., Maldonado, J.J.: Recommending Self-Regulated Learning Strategies Does Not Improve Performance in a MOOC. In: L@S '16 (2016)

SOLUTION

- Apply empirically-backed theory from the learning sciences
- Translate traditional classroom approaches into an edX MOOC environment

RETRIEVAL PRACTICE

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

thinking about, explicitly stating, and reflecting on goals

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.)?

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?

H2

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

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.

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.

H4

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

EXPERIMENTAL SETUP

MOOC	STRATEGY	ENROLLED	PASS RATE	STUDY PARTICIPANTS	COHORTS
Functional Programming	Retrieval Practice	27,884	5.05%	9,836	3
Industrial Biotechnology	Study Planning	11,042	4.08%	1,963	2

MOOC	STRATEGY	ENROLLED	PASS RATE	STUDY PARTICIPANTS	COHORTS
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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:

e.g. – 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.

PLAN

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.

REFLECT

Bookmark

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?’

CUED

Cued: prompted to write summary (retrieval cue)

Bookmarks

Bookmark

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.

22% OF ACTIVE* LEARNERS CLICKED ON A RETRIEVAL CUE

14% OF ACTIVE* LEARNERS CLICKED ON A STUDY PLANNING MODULE

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.

RQ

Does ideos

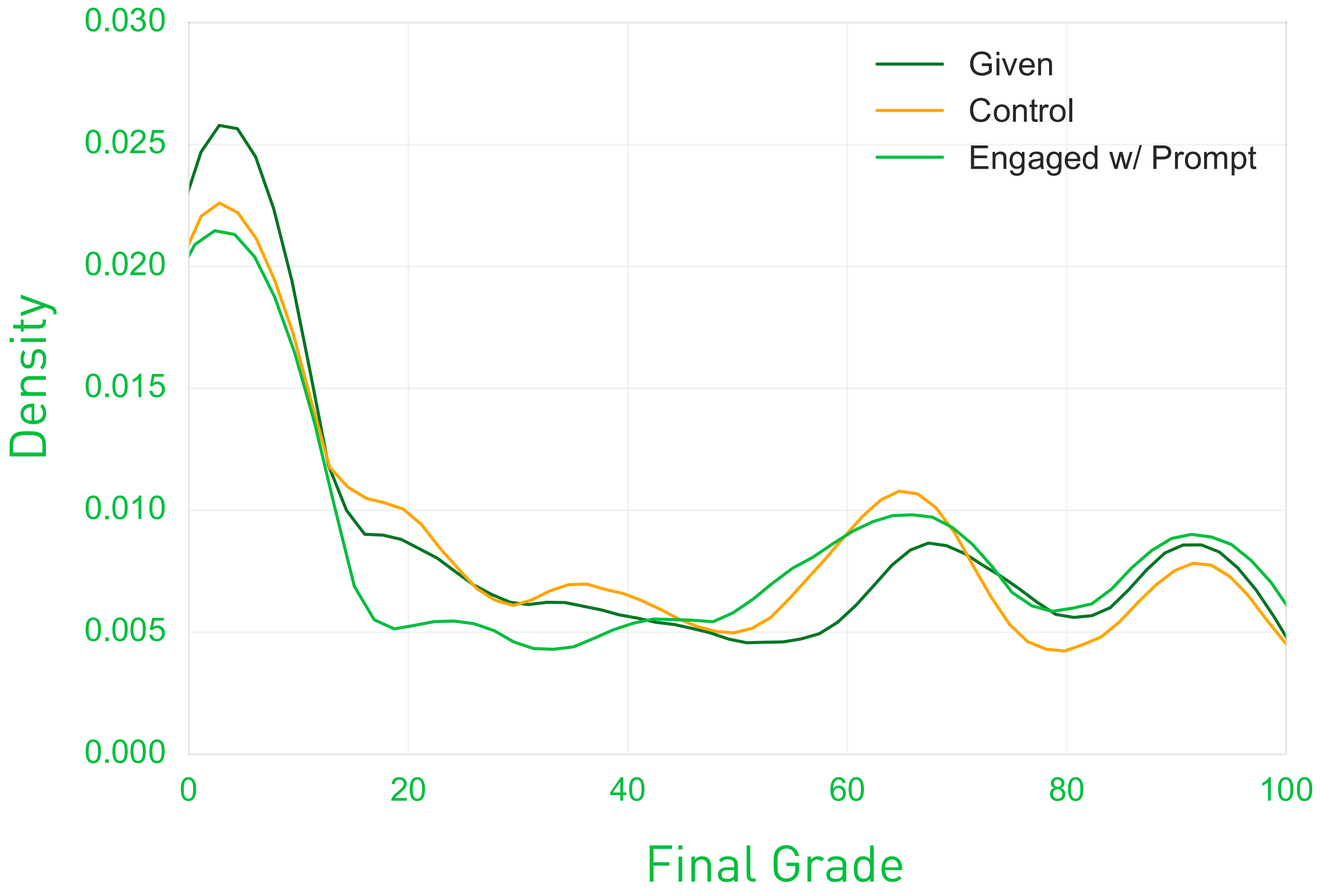
incre

H2

Activ better

exar

Functional Programming Grades By Group



RQ

Does ideos

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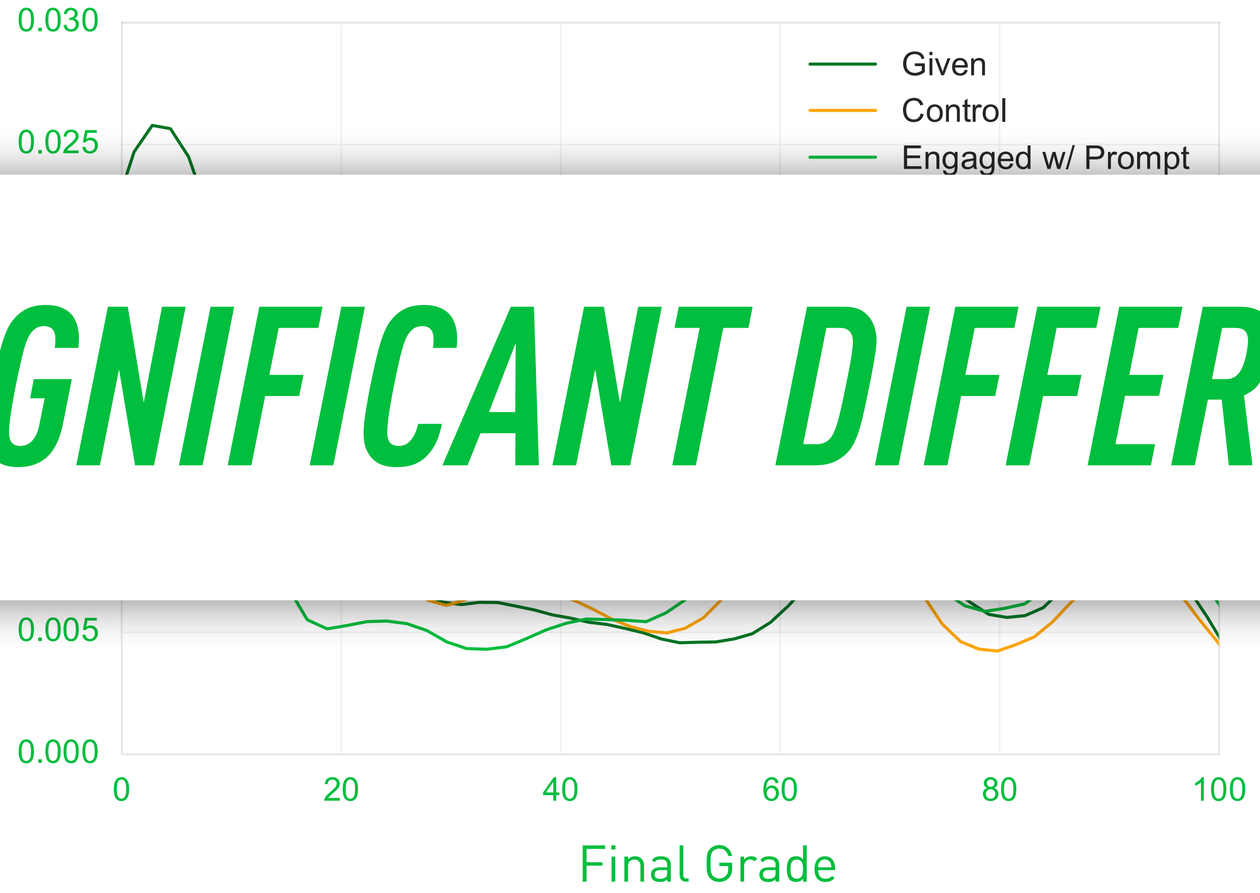
Activ better

exar

Functional Programming Grades By Group



NO SIGNIFICANT DIFFERENCES

RQ3

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

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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

INTENTION TO TREAT (ITT):

NO SIGNIFICANT DIFFERENCES

their study habits will increase their engagement with the course. [11,17].

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.

STUDY PLANNERS:

SIGNIFICANT DIFFERENCES

- ✓ FINAL GRADE
- ✓ PERSISTENCE
- ✓ SESSION COUNT
- ✓ TIME IN COURSE

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

TAKEAWAYS

1. THEORY ISN'T ENOUGH

2. IT MUST BE ACTIVATED WITH ENGAGING INTERFACES

3. SMALL INTERVENTIONS LEAD TO SMALL RESULTS

BIT.LY/WIS-LEARNING-ANALYTICS

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THANK YOU

- LEIDEN-DELFT-ERASMUS CENTRE FOR EDUCATION AND LEARNING (CEL)
- TU DELFT EXTENSION SCHOOL
- ERASMUS+ PROGRAM EU PROJECT: STELA

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