

(Dis)Engagement patterns in

Questionnaire Design for Social Surveys

University of Michigan

MOOC

GOR, 3 March 2016

Problem Definition

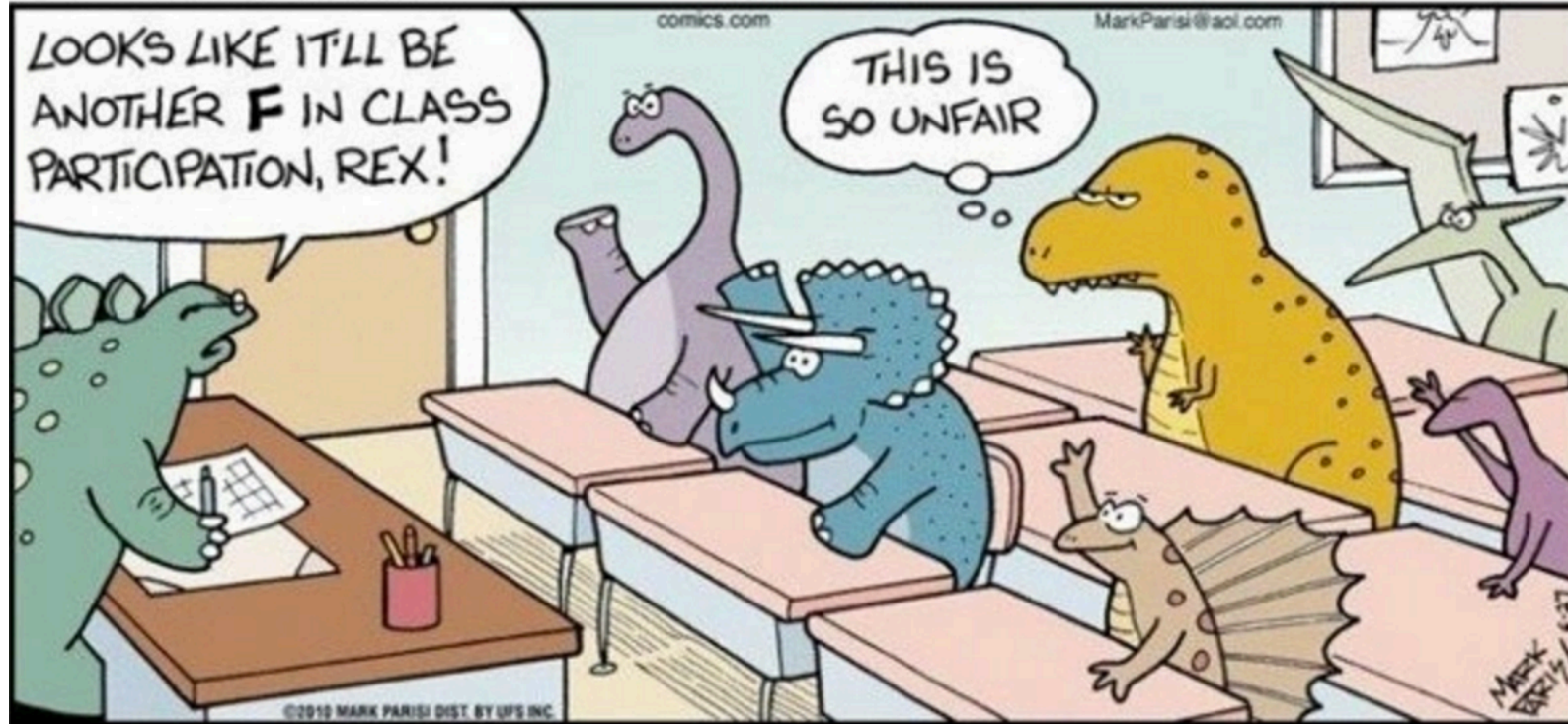
MOOC completion rates are below 15%



Coursera (2013)



Problem Definition



Heterogeneity matters

Research Questions

Questionnaire Design for Social Surveys

University of Michigan

#1 Given the heterogeneity of learners, what are the main patterns of engagement with MOOC components?

(Learning analytics behavior data)

#2 How do the identified engagement groups differ in their motivation, satisfaction with the course and other relevant survey measures?

(Survey data)

Questionnaire Design for Social Surveys MOOC

- 58 141 participants from all over the world have enrolled in the course so far (this analysis is limited to 3 waves=47 690).
- Course information:
 - 6 Units (Weeks)
 - Pre-Recorded Videos: several short videos for each unit
 - Quizzes (per Unit, in the last Unit: Final Exam)
 - Peer-Graded Project

A dark blue vertical sidebar menu with a hamburger icon at the top. The text is white. The items are: Course Content, Week 1, Week 2, Week 3, Week 4, Week 5, and Week 6. 'Course Content' is the most prominent item.

Course Content

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

Approaching Heterogeneity

Kizilcec et al. (2013) k-means clustering (L1 norm) approach:

Student	Unit 1	Unit 2	Unit 3	Unit 4
A	On track (=3)	Behind (=2)	Auditing (=1)	Out (=0)
B	Auditing (=1)	On track (=3)	Auditing (=1)	Out (=0)
C	On track (=3)	Behind (=2)	On track (=3)	Behind (=2)

- Found clusters: **completion & auditing** **disengaging & sampling**

More satisfied

Less satisfied

Analysis – Kmeans Clustering

Adjusting Kizilcec et al. (2013):

Student	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
A	On track (=3)	Almost on track (=2)	Auditing (=1)	Out (=0)	Etc.	Etc.

on track: all assignments attempted + at least 50% of videos attempted

almost on track: all assignment attempted + less than 50% of videos are attempted

auditing: just attempting to watch videos (no assignments)

out: no engagement (in a particular unit)

Questionnaire Design for Social Surveys MOOC



Active after registration	Active with material	●	20,272
	NOT active with material	●	12,362
NOT active after registration	NOT active with material	●	15,056
Grand Total		●	47,690

Data used for the further analysis:
 Participants active with at least some material component in at least 1 of the units

Findings

Completing

Sampling

Disengagement

Auditing



Completing

Gradual
disengagement

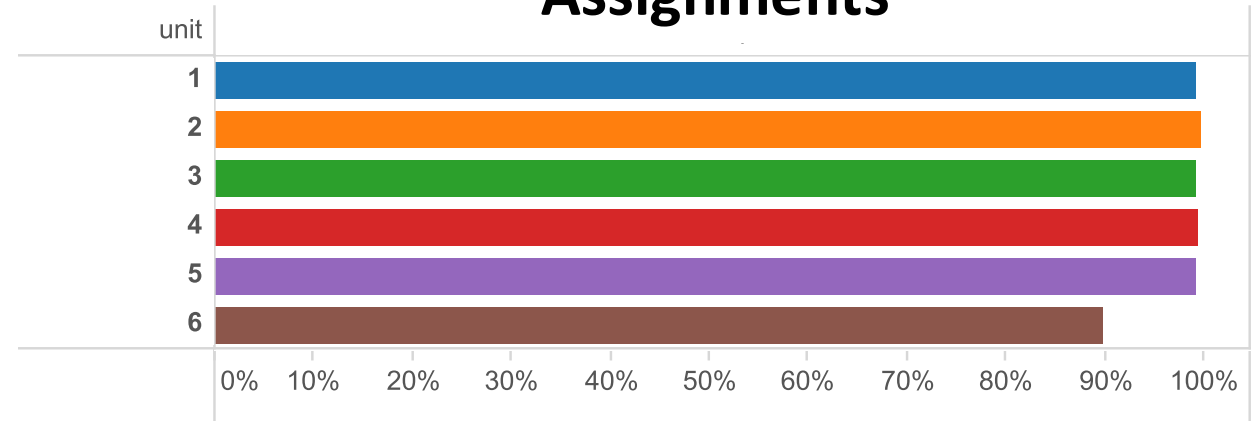
Fast
disengagement

Disengaging
auditing

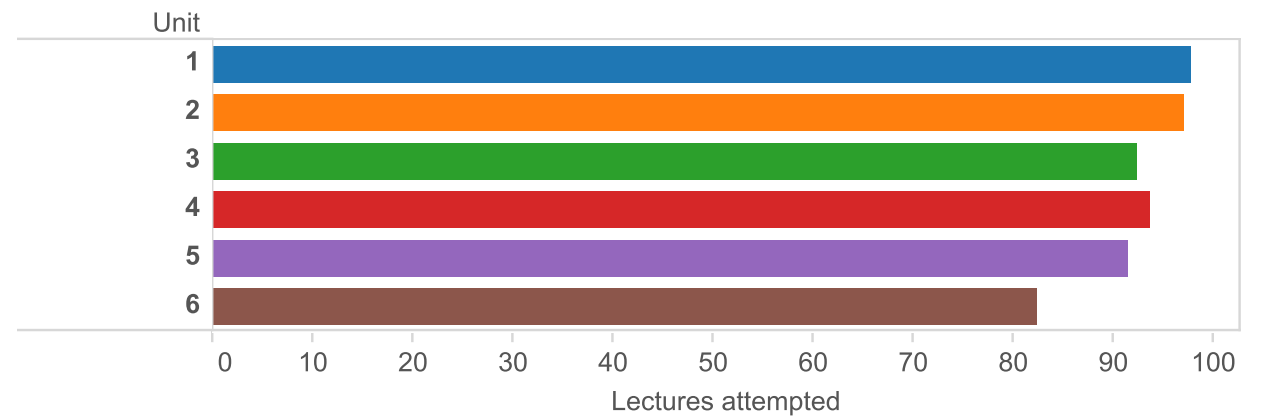
Completing

14,42% of all respondents
77,88% are employed

Assignments



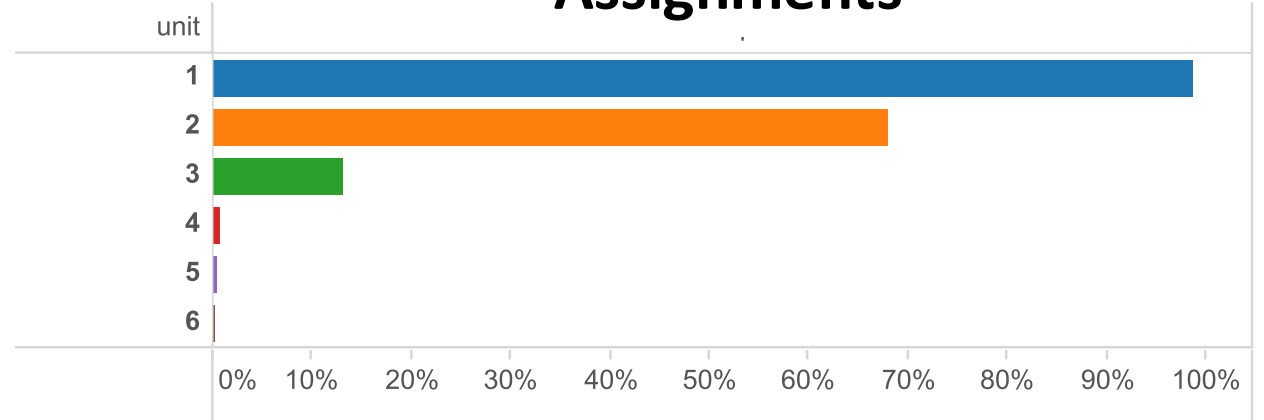
Video Lectures



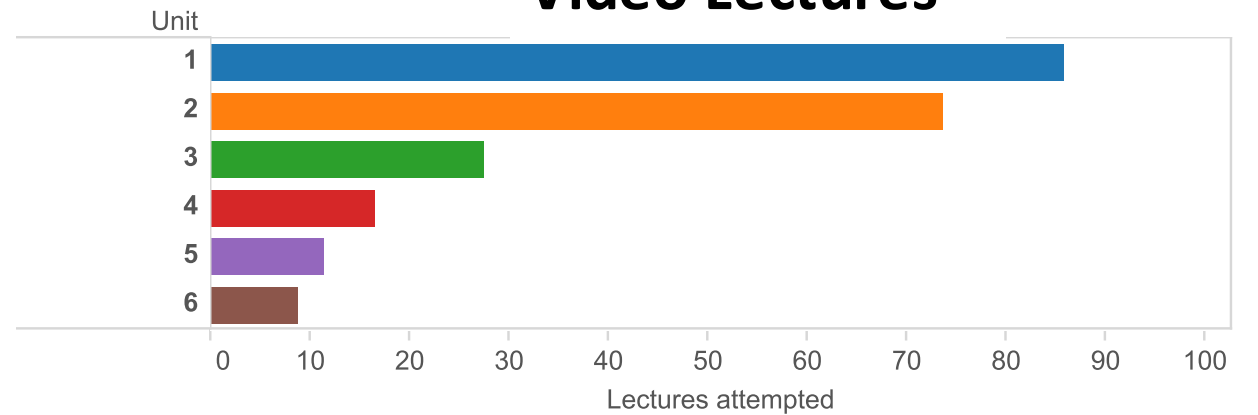
Fast Disengagement

12, 19% of all respondents
46,67% are employed

Assignments



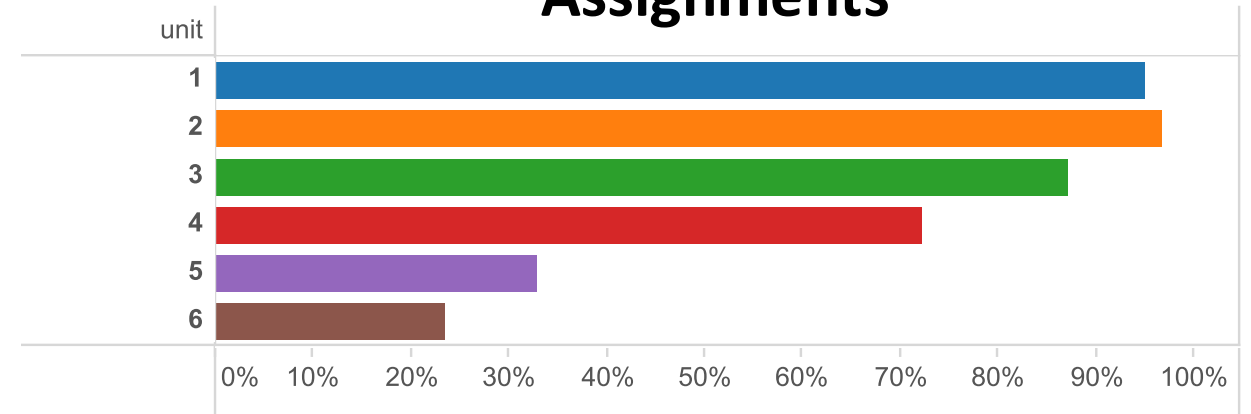
Video Lectures



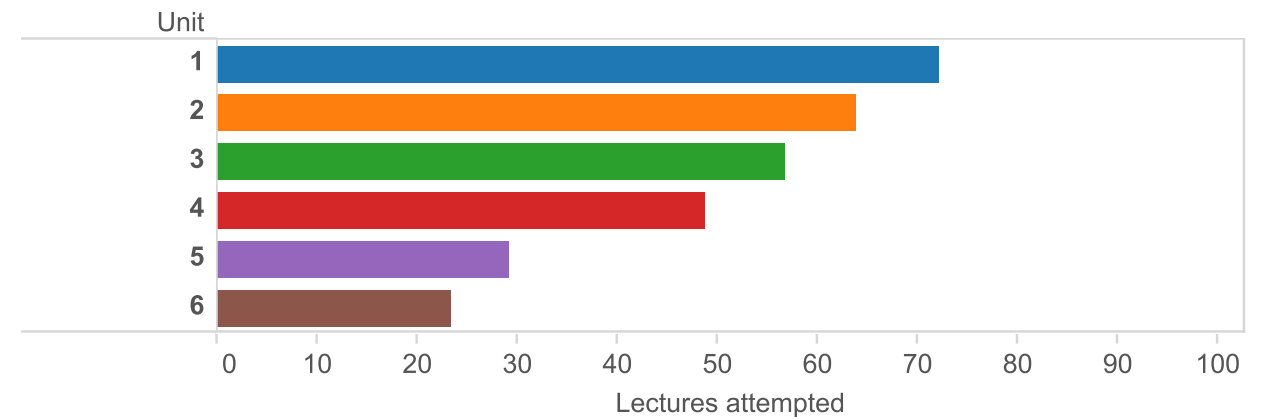
Gradual Disengagement

6,03% of all respondents
70,24% are employed

Assignments



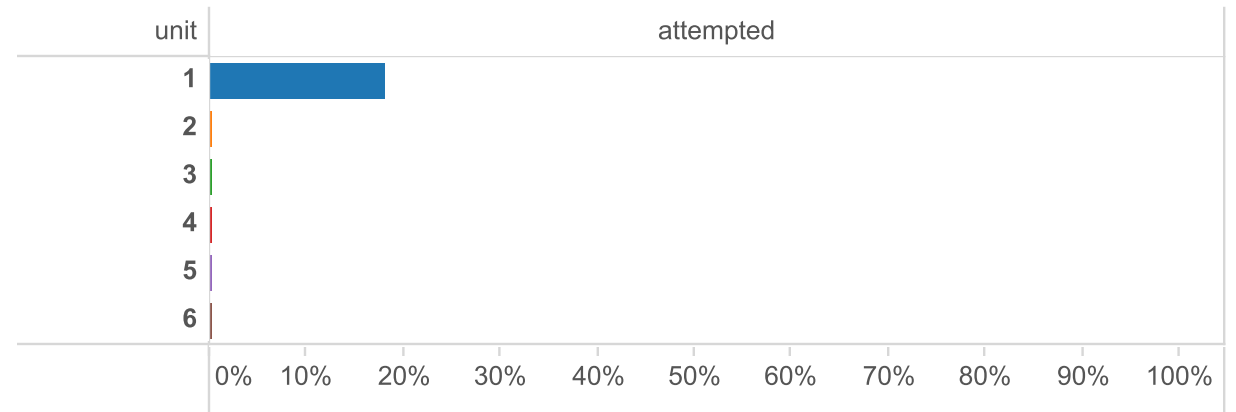
Video Lectures



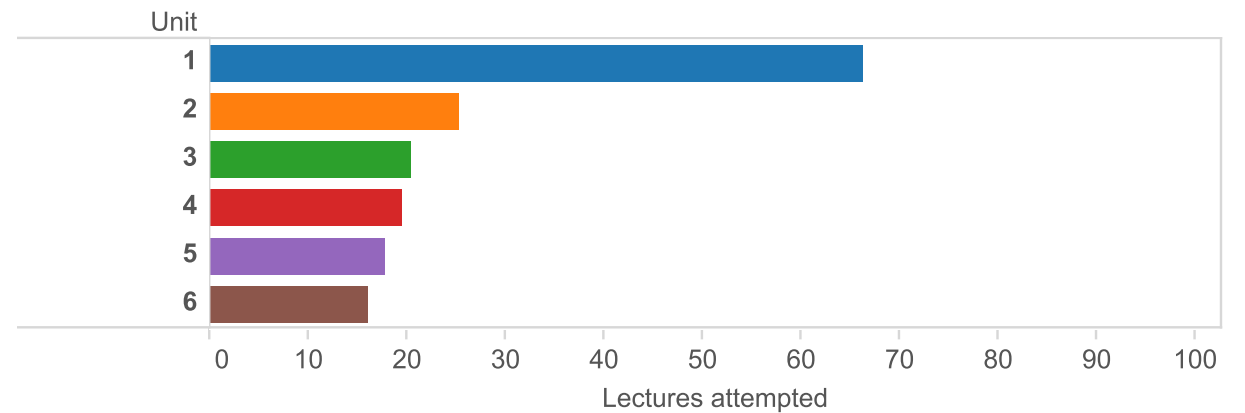
Disengaging Auditing

67,36% of all respondents
58,75% are employed

Assignments



Video Lectures



Course Survey Data

Survey	Active Material	
	Active with material	NOT active with mat..
DID not participate in survey	94.52%	99.93%
participated in survey	5.48%	0.07%

Cluster	Completing	Gradual Disengagement	Fast Disengagement	Disengaging Auditing
% participated in a survey (n participants)	30,88% (904)	6,86 % (84)	1,82% (80)	0,59% (45)

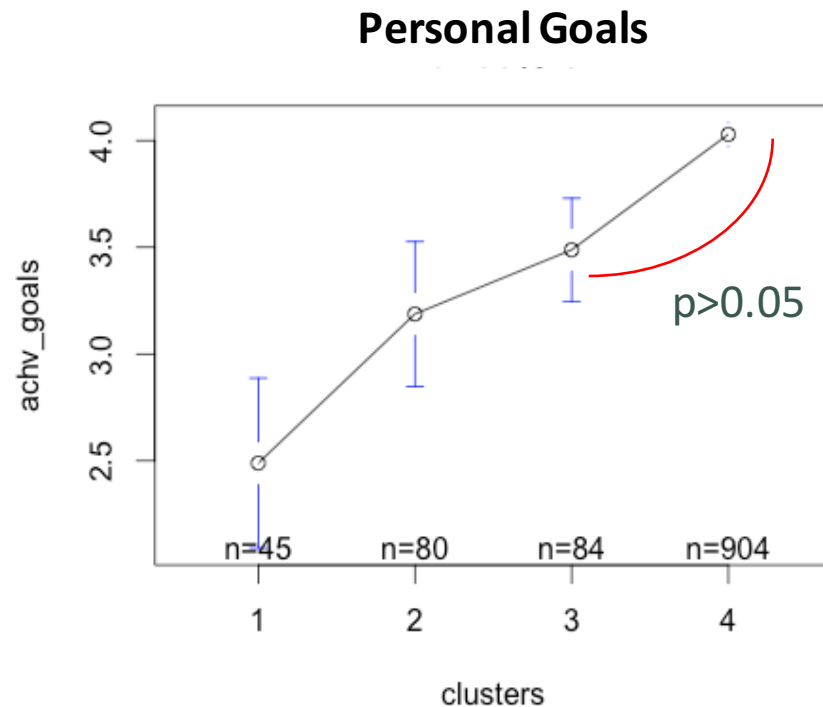
Motivation/Goals

1 - Fast
Disengagement

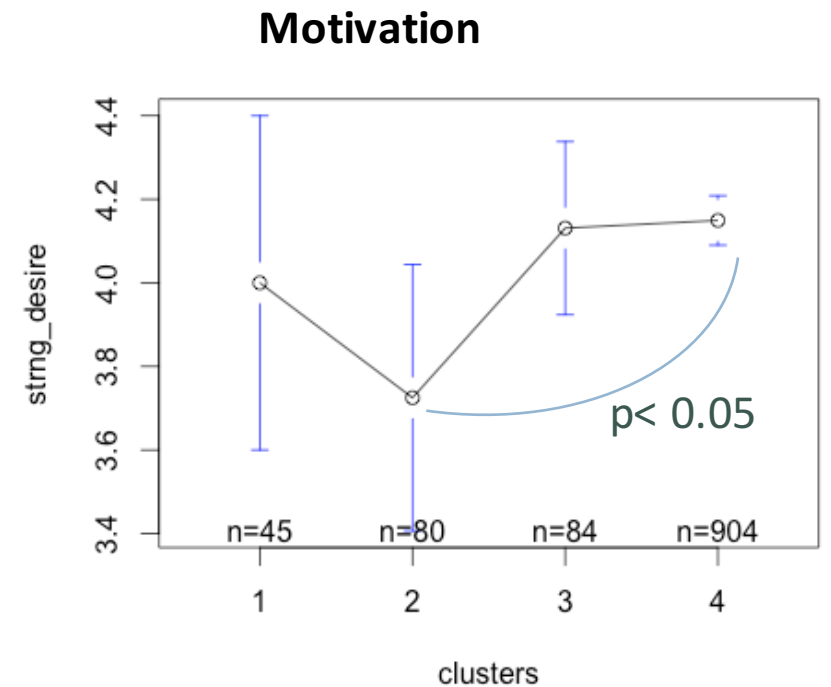
2 - Disengaging
Auditing

3 - Gradual
Disengagement

4 - Completion



Agreement item: I feel like I achieved my personal goals for this course (1-Strongly Disagree, 5-Strongly Agree)



Agreement item: I had a strong desire to take this course (1-Strongly Disagree, 5-Strongly Agree)

Possible Problems?

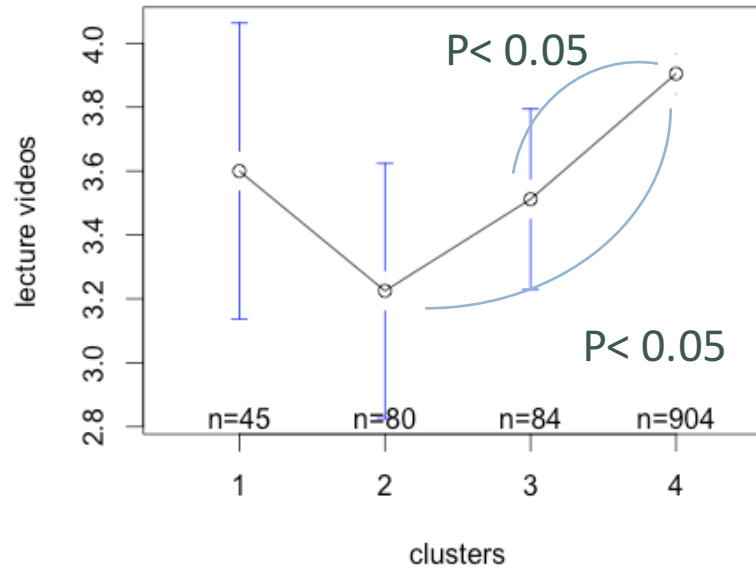
1 - Fast
Disengagement

2 - Disengaging
Auditing

3 - Gradual
Disengagement

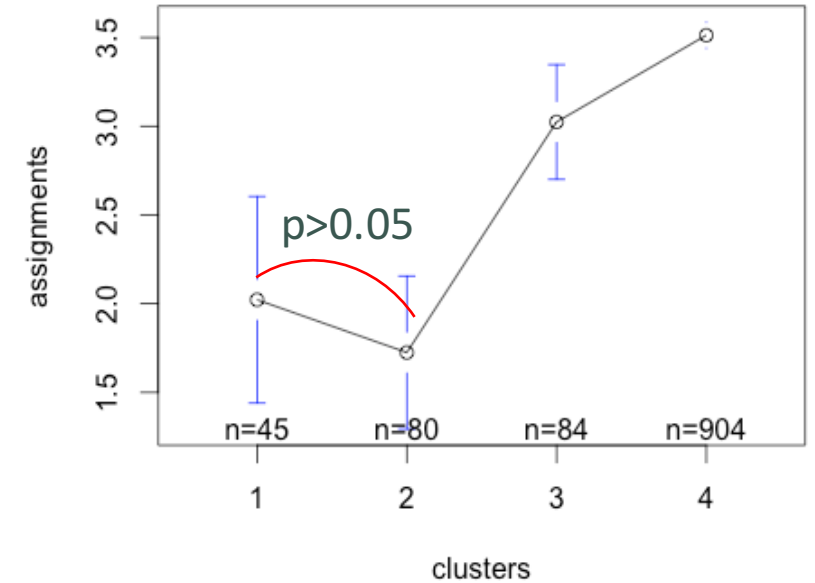
4 - Completion

Video Lectures



How did you feel about course videos
(1-Poor, 5-Excellent)

Assignments



How did you feel about assessments
(assignments, exams) (1-Poor, 5-Excellent)

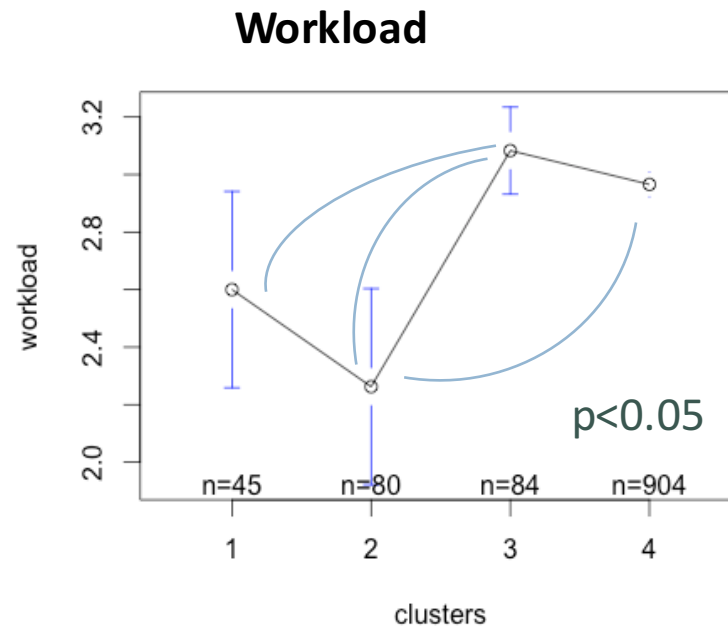
Possible Problems #2?

1 - Fast
Disengagement

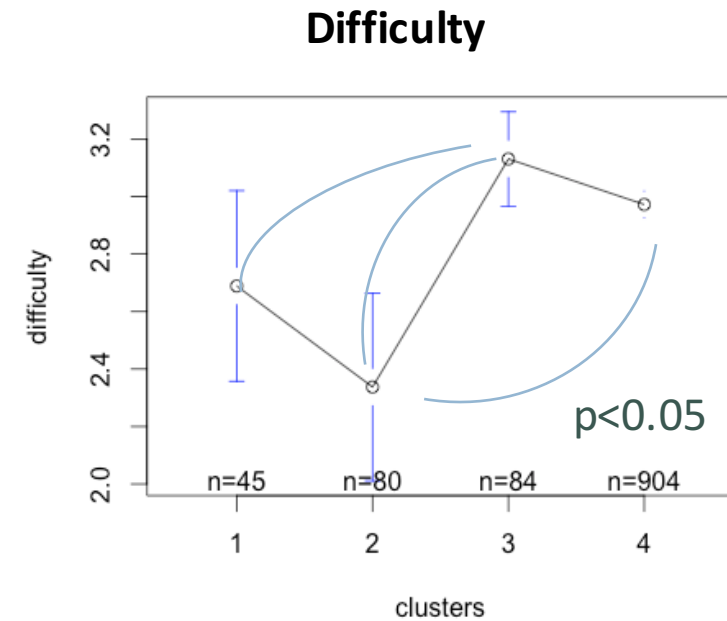
2 - Disengaging
Auditing

3 - Gradual
Disengagement

4 - Completion



Please, rate course workload
(1-very light, 5-very heavy)



Please, rate course difficulty
(1-very easy, 5-very difficult)

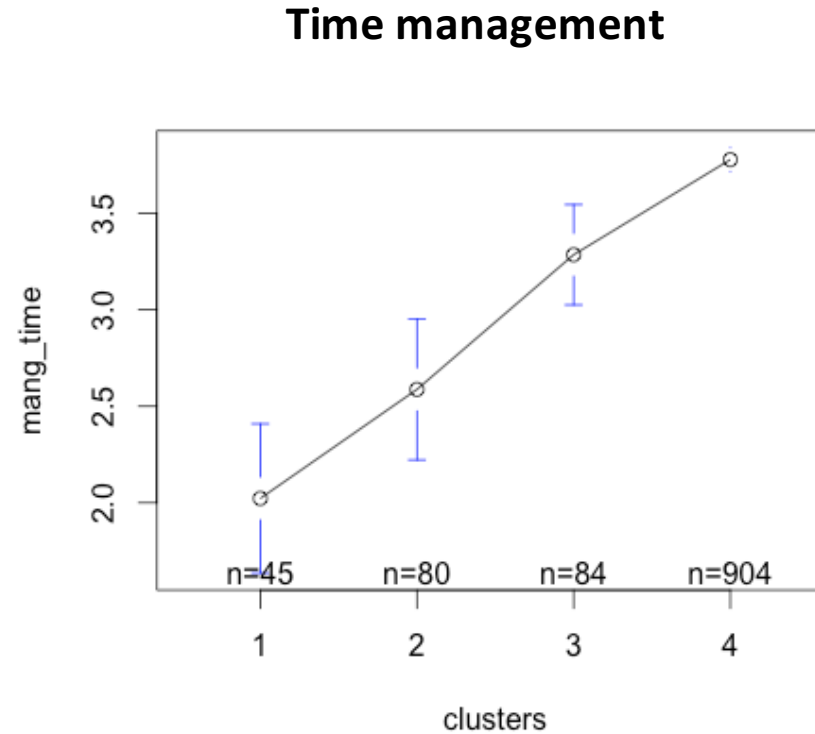
Possible Problems #3?

1 - Fast
Disengagement

2 - Disengaging
Auditing

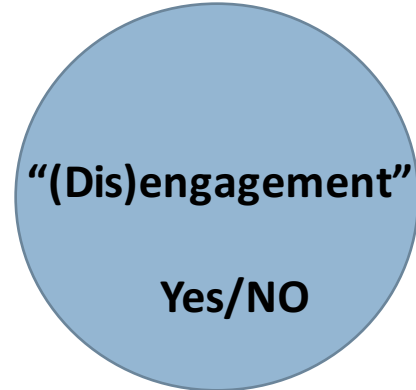
3 - Gradual
Disengagement

4 - Completion



I am satisfied with how I managed my time in this course, (1-Poor, 5-Excellent)

Conclusion



versus

Completion

**Gradual
disengagement**

**Fast
disengagement**

**Disengaging
auditing**

Conclusion

Possibly:

Completion

- ✓ mostly employed
- ✓ good with time management
- ✓ found the right difficulty level

Gradual disengagement

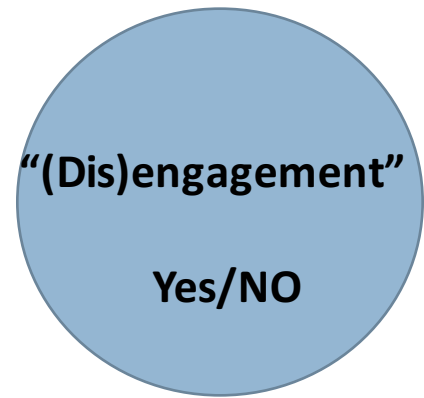
- ✓ mostly employed
- ✓ could improve their time management
- ✓ report to be as satisfied with with their achieved course goals as “completion” group

Fast disengagement

- ✓ could improve their time management
- ✓ are less satisfied with the assignments (because?->)
- ✓ find the course level too easy
- ✓ seem to be less satisfied with achieving their course goals.

Disengaging auditing

- ✓ similar to “fast disengagement” group +
- ✓ seem to be less motivated (at the beginning of the course).



versus

Conclusion

Possibly:

Completion

- ✓ mostly employed
- ✓ good with time management
- ✓ found the right difficulty level



Gradual disengagement

- ✓ mostly employed
- ✓ could improve their time management
- ✓ report to be as satisfied with with their achieved course goals as “completion” group



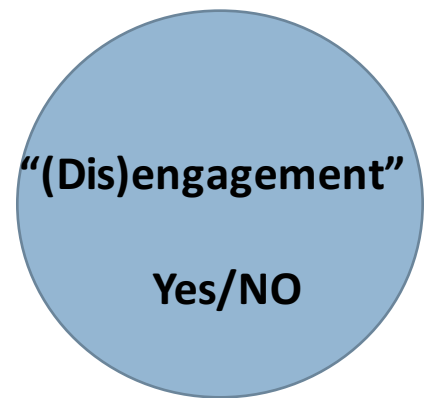
Fast disengagement

- ✓ could improve their time management
- ✓ are less satisfied with the assignments (because?->)
- ✓ find the course level too easy
- ✓ seem to be less satisfied with achieving their course goals.



Disengaging auditing

- ✓ similar to “fast disengagement” group +
- ✓ seem to be less motivated (at the beginning of the course).



versus

Further Steps

- Alternative way of defining the trajectories across the units
- Work with more detailed web matrices (pause, re-playing behavior, etc.)
- Try alternative methods that are more appropriate for categorical data (e.g. multiple correspondence analysis).
- **The biggest PROBLEM to address:** potential bias due to non-response in course surveys. The severity of the bias and methods for bias reduction in the MOOC context is not researched (see Kizilcec 2014 on the example of weighting technique). So far, no study using multiple imputation approach.
- Without addressing the issue of survey data quality we cannot fully understand online learner heterogeneity

Thank you!