

Redefining “What” in Analyses of Who Does What in MOOCs

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Overview

- Recent years have seen a rise in popularity of Massive Open Online Courses (MOOCs).
- Prior studies have often been conducted on a single MOOC or single MOOC Domain.
- There is an increased need to understand how learners engage with MOOC resources and their behavior patterns and motivations.
- Factor Analysis allows researchers to examine behavior from both the student and activity level
- Students did not exhibit much “shopping” behavior in the courses analyzed.

MOOC Courses

- The data were collected from four courses offered by the University of Pittsburgh on the Coursera platform
- Three different disciplines: Health Science, Education, and Public Health.
- Three of the four classes were offered multiple times, for a total of 10 sessions.
- Each offering lasted 6 or 7 weeks.

Participants

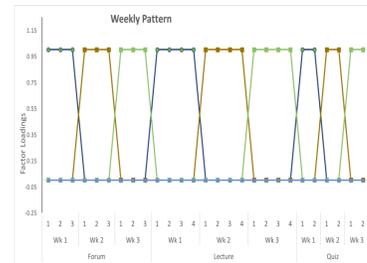
- The data were collected from 297,736 enrolled learners and 132,324 who performed at least one activity (active learners) (42% ± 15% of a course).
- Three types of activities were considered: Watching Lectures, Taking Quizzes, and posting on the Forums.
- 32,131 learners submitted a demographic survey (10% ± 4% of a course).

Methodology

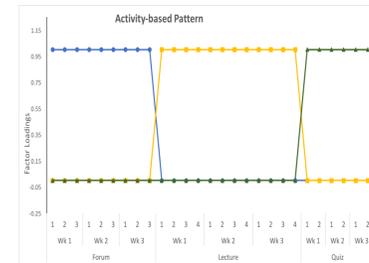
- We only considered activities for which at least 1% of active learners participated (80% of all activities).
 - For example, in a course with 10,000 active learners, any activity used by less than 100 learners was removed.
 - We removed 20% of course activities through this step.
- Factor analysis was used to group course activities (PCA with Varimax).
- Regressions were used to examine individual differences in factor behavior.

Factor Analysis

If students are “shopping” weekly :

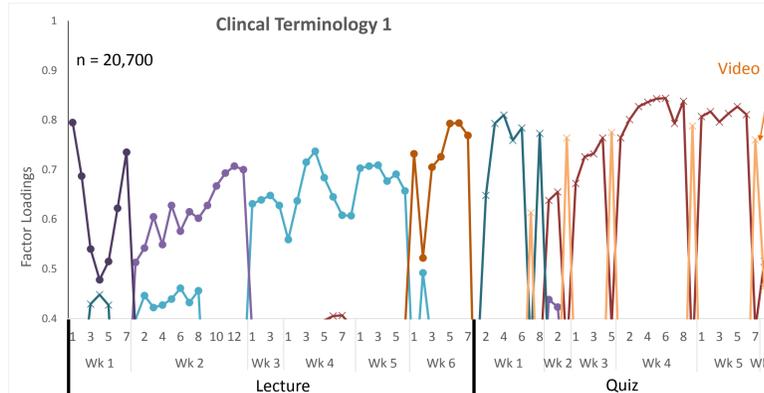
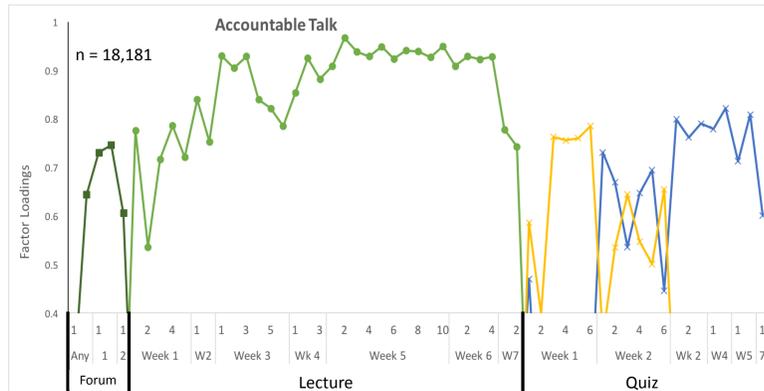
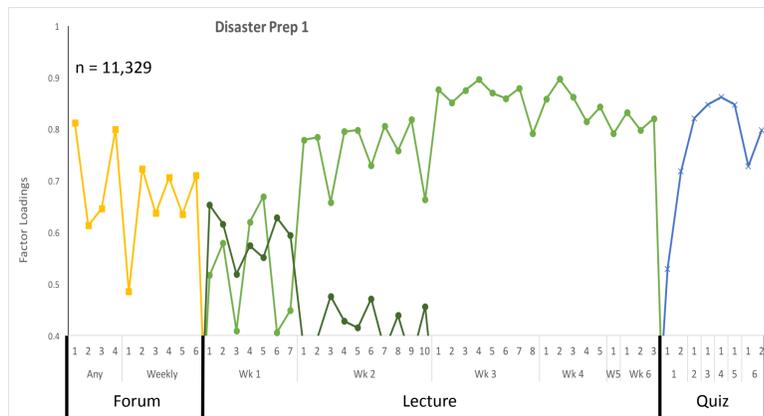
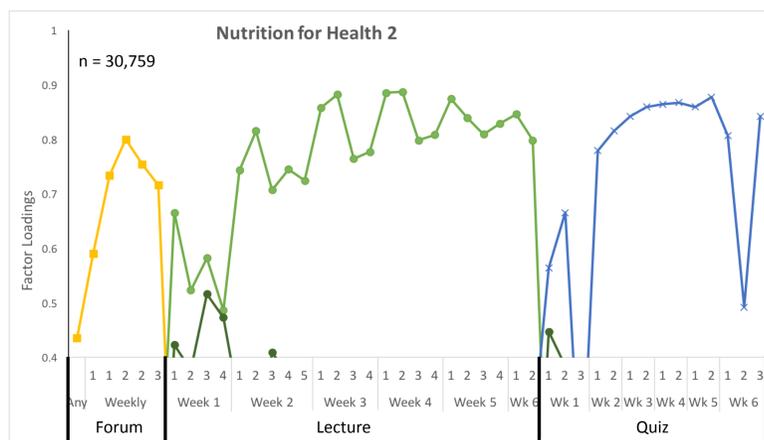


If students are choosing by activities:

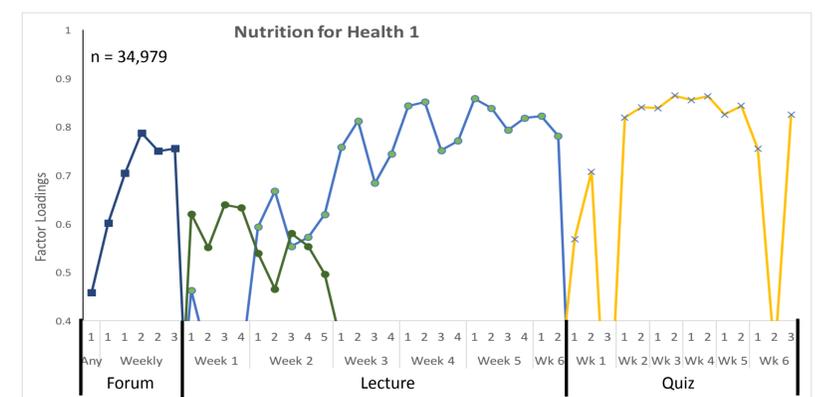


- In three of the Four courses, type of activity is stronger than the weekly structure of the course.
- Two of the courses show early lecture activity as a factor.
- Two of the courses show early quiz factors as separate from later ones.
- One course showed weekly activity patterns.

Factor Graphs



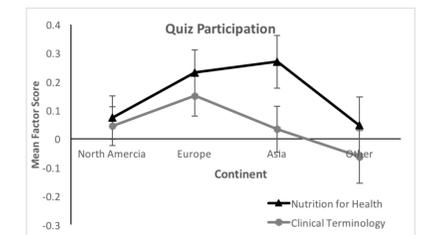
Stability by Offering



Individual Differences

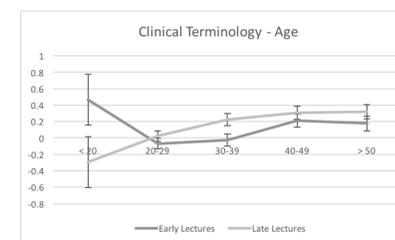
- We selected two offerings within the Health Sciences domain.
- Each student was assigned a factor score for each factor extracted.
- For Clinical Terminology, the average score of weekly activities was used for comparison.

Predictor	Factor			
	Early Lectures	Late Lectures	Quizzes	Forums
Nutrition for Health				
Age	.24	-.001	.10	.55
Continent	.31	-.10	-.02	.28
Gender	-.03	.001	-.24	.95
Education Level	.84	.001	.50	.50
Native English Speaker	.10	-.05	.42	-.01
Industry	.78	.52	.001	-.01
Clinical Terminology				
Age	.001	.001	.07	N/A
Continent	.06	.78	.05	N/A
Gender	.77	.87	.001	N/A
Education Level	.87	.81	.80	N/A
Native English Speaker	.82	.18	.74	N/A
Industry	.83	.06	.36	N/A

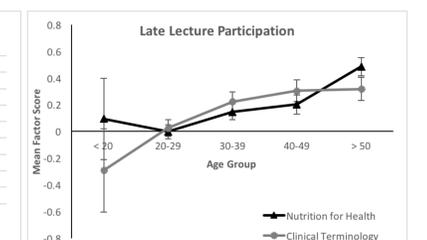


Asia is only significantly more active in Quizzes in Nutrition for Health.

Both courses exhibit individual differences, but pattern is varied.



Very young learners are more likely to watch earlier lectures.



Older learners are more likely to watch later lectures in Nutrition

Conclusions

- Factor analysis enables researchers to answer questions about the course structure.
- Most of the courses had a similar activity patterns: Quiz, Lecture and Forum factors.
- Only one course exhibited weekly activity patterns.