

The Life Cycle of a Million MOOC Users

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Project Goals

- Understand the movement of a million users through Coursera courses offered by the University of Pennsylvania, June 2012 – June 2013
- Produce a map of this movement that identifies key user-transition points

Conceptual Framework: Movement Through “Traditional” Courses



Apply

Enroll

Engage

Learn /
Persist /
Complete

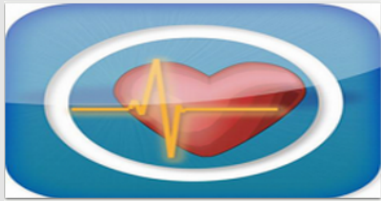
Research Questions

1. What is the movement through selected courses?
 - a. When do users enter and leave a course?
 - b. When and how do users “participate” in a course?
 - c. What are critical markers of academic progress and course completion?
2. How does movement through a course vary based on course characteristics?

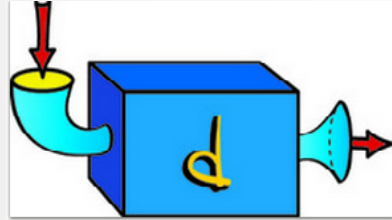
Research Methods:

- Descriptive analyses of transaction data and course syllabi

Population: 17 First-Generation Penn Coursera Courses



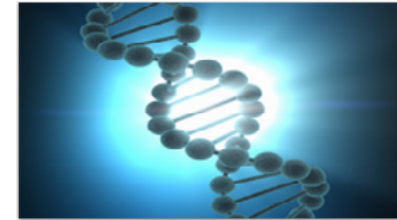
Cardiac Arrest, Hypothermia, and Resuscitation Science



Calculus: Single Variable



Design: Creation of Artifacts in Society



Experimental Genome Science



Fundamentals of Pharmacology



Camification



Greek and Roman Mythology



Growing Old Around the Globe



Health Policy and the Affordable Care Act



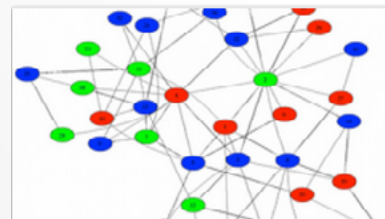
An Introduction to Operations Management



Listening to World Music



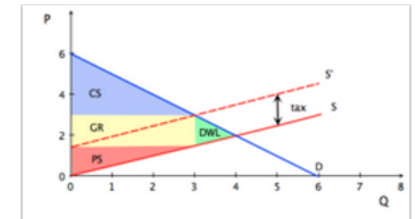
Modern & Contemporary American Poetry



Networked Life



"Pay Attention!!" ADHD Through the Lifespan



Principles of Microeconomics



Rationing and Allocating Scarce Medical Resources



Vaccines

Characteristics of Selected Courses

Much variation in orientation, structure, and approach:

- Subject area
- Target audience
- Level of difficulty
- Course length
- Instructional time
- Instructional support
- Peer assessment and discussion
- Homework and quizzes

Variation in Course Orientation

Orientation	# Courses	Course Name
College	2	<ul style="list-style-type: none"> -Calculus: Single Variable -Principles of Microeconomics
Occupational	7	<ul style="list-style-type: none"> -Cardiac Arrest, Resuscitation Science, and Hypothermia -Gamification -Networked Life -Introduction to Operations Management -Fundamentals of Pharmacology -Rationing and Allocating Scarce Medical Resources -Vaccines
Enrichment	8	<ul style="list-style-type: none"> -Pay attention!! ADHD through Lifespan -Design: Creation of Artifacts in Society -Health Policy and Affordable Care Act -Experimental Genome Science -Modern and Contemporary American Poetry -Greek and Roman Mythology -Listening World Music -Growing Old Around the Globe

Variation in Course Length

# Weeks	# Courses	Course Name
6	4	-Growing Old around the Globe -Cardiac Arrest, Resuscitation Science, and Hypothermia -Gamification -Networked life
7	2	-Rationing and Allocating Scarce Medical Resources -Listening to World Music
8	3	-Health Policy and Affordable Care Act -Vaccines -Design: Creation of Artifacts in Society
9	2	-Principles of Microeconomics -Introduction to Operations Management
10	3	-Modern and Contemporary American Poetry -Fundamental of Pharmacology -Greek and Roman Mythology
12	1	-Pay Attention!! ADHD Through the Lifespan
13	1	-Calculus: Single Variable
14	1	-Experimental Genome Science

Variation in Course Prerequisites

Prerequisite	# Courses	Course Name
Suggested	2	<ul style="list-style-type: none"> -Pay Attention!! ADHD through Lifespan -Calculus: Single Variable
None	8	<ul style="list-style-type: none"> -Gamification -Health Policy and Affordable Care Act -Networked Life -Modern and Contemporary American Poetry -Principles of Microeconomics -Rationing and Allocating Scarce Medical Resources -Listening to World Music -Growing Old Around the Globe
Not Specified	7	<ul style="list-style-type: none"> -Cardiac Arrest, Resuscitation Science, and Hypothermia -Design: Creation of Artifacts in Society -Experimental of Genome Science -Fundamental of Pharmacology -Greek and Roman Mythology -Introduction to Operations Management -Vaccines

Variation in Use of Peer Assessment

Peer Assessment	# Courses	Course Name
Yes	8	<ul style="list-style-type: none"> -Design: Creation of Artifacts in Society -Gamification -Health Policy and Affordable Care Act -Greek and Roman Mythology -Modern and Contemporary American Poetry -Principles of Microeconomics -Rationing and Allocating Scarce Medical Resources -Listening to World Music
No	9	<ul style="list-style-type: none"> -Pay Attention!! ADHD through Lifespan -Cardiac Arrest, Resuscitation Science, and Hypothermia -Calculus: Single Variable -Experimental of Genome Science -Grow Old around the Globe -Introduction to Operations Management -Networked Life -Fundamentals of Pharmacology -Vaccines

Variation in Use of Live Chat

Live Chat	# Courses	Course Name
Live Chat	3	<ul style="list-style-type: none"> -Growing Old around the Globe -Modern and Contemporary American Poetry -Principles of Microeconomics
No Live Chat	14	<ul style="list-style-type: none"> -Pay attention!! ADHD through Lifespan -Cardiac Arrest, Resuscitation Science, and Hypothermia -Calculus: Single Variable -Design: Creation of Artifacts in Society -Gamification -Experimental Genome Science -Health Policy and Affordable Care Act -Greek and Roman Mythology -Networked Life -Introduction to Operations Management -Fundamentals of Pharmacology -Rationing and Allocating Scarce Medical Resources -Listening to World Music -Vaccines

Variation in Use of Teaching Assistants

Course Name	Number TAs
-Cardiac Arrest, Resuscitation Science, and Hypothermia	1
-Experimental Genome Science	2
-Introduction to Operations Management	2
-Pay Attention!! ADHD Through the Lifespan	2
-Vaccines	2
-Fundamentals of Pharmacology	3
-Listening to World Music	3
-Rationing and Allocating Scarce Medical Resources	3
-Design: Creation of Artifacts in Society	4
-Health Policy and Affordable Care Act	4
-Networked life	4
-Greek and Roman Mythology	5
-Modern and Contemporary American Poetry	5
-Gamification	6
-Principles of Microeconomics	12
-Calculus: Single Variable	13
-Growing Old around the Globe	15

Variation in Expected Student Workload

# Hours Per Week	# Courses	Course Name
7 or Fewer	9	<ul style="list-style-type: none"> -Pay attention!! ADHD through Lifespan -Experimental Genome Science -Health Policy and Affordable Care Act -Modern and Contemporary American Poetry -Principles of Microeconomics -Networked Life -Rationing and Allocating Scarce Medical Resources -Listening World Music -Vaccines
More than 7	3	<ul style="list-style-type: none"> -Calculus: Single Variable -Greek and Roman Mythology -Grow Old around the Globe
Not Specified	5	<ul style="list-style-type: none"> -Cardiac Arrest, Resuscitation Science, and Hypothermia -Gamification -Design: Creation of Artifacts in Society -Fundamentals of Pharmacology -Introduction to Operations Management

Variation in Weekly Videos

	1-3 Videos / Week	4-6 Videos / Week	7 or More Videos / Week
40 or Fewer Minutes of Video	<p>(5)</p> <ul style="list-style-type: none"> -Fundamentals of Pharmacology -Health Policy & Affordable Care -ADHD -Rationing/Allocating Resources -Vaccines 	<p>(1)</p> <ul style="list-style-type: none"> -Grow Old Around the Globe 	
40 to 60 Minutes of Video	<p>(1)</p> <ul style="list-style-type: none"> -Cardiac Arrest, Resuscitation Science, and Hypothermia 	<p>(2)</p> <ul style="list-style-type: none"> -Experimental Genome Science -Listening World Music 	<p>(2)</p> <ul style="list-style-type: none"> -Design: Creation of Artifacts -Gamification
More than 60 Minutes of Video		<p>(2)</p> <ul style="list-style-type: none"> -Calculus: Single Variable -Networked Life 	<p>(4)</p> <ul style="list-style-type: none"> -Greek and Roman Mythology -Operations Management -Modern & Contemporary American Poetry -Principles of Microeconomics

Variation in Other Course Requirements

	Final Exam	No Final Exam
Optional Reading or Video	(2) -Design: Creation of Artifacts in Society -Gamification	(2) -Cardiac Arrest -Modern/Contemporary Poetry
No Optional Reading or Video	(5) -Pay attention!! ADHD through Lifespan -Calculus: Single Variable -Operations Management -Principles of Microeconomics -Listening World Music	(8) -Experimental Genome Science -Grow Old Around the Globe -Health Policy and Affordable Care Act -Greek and Roman Mythology -Networked Life -Fundamentals of Pharmacology -Rationing and Allocating Resources -Vaccines

What Are We Measuring?

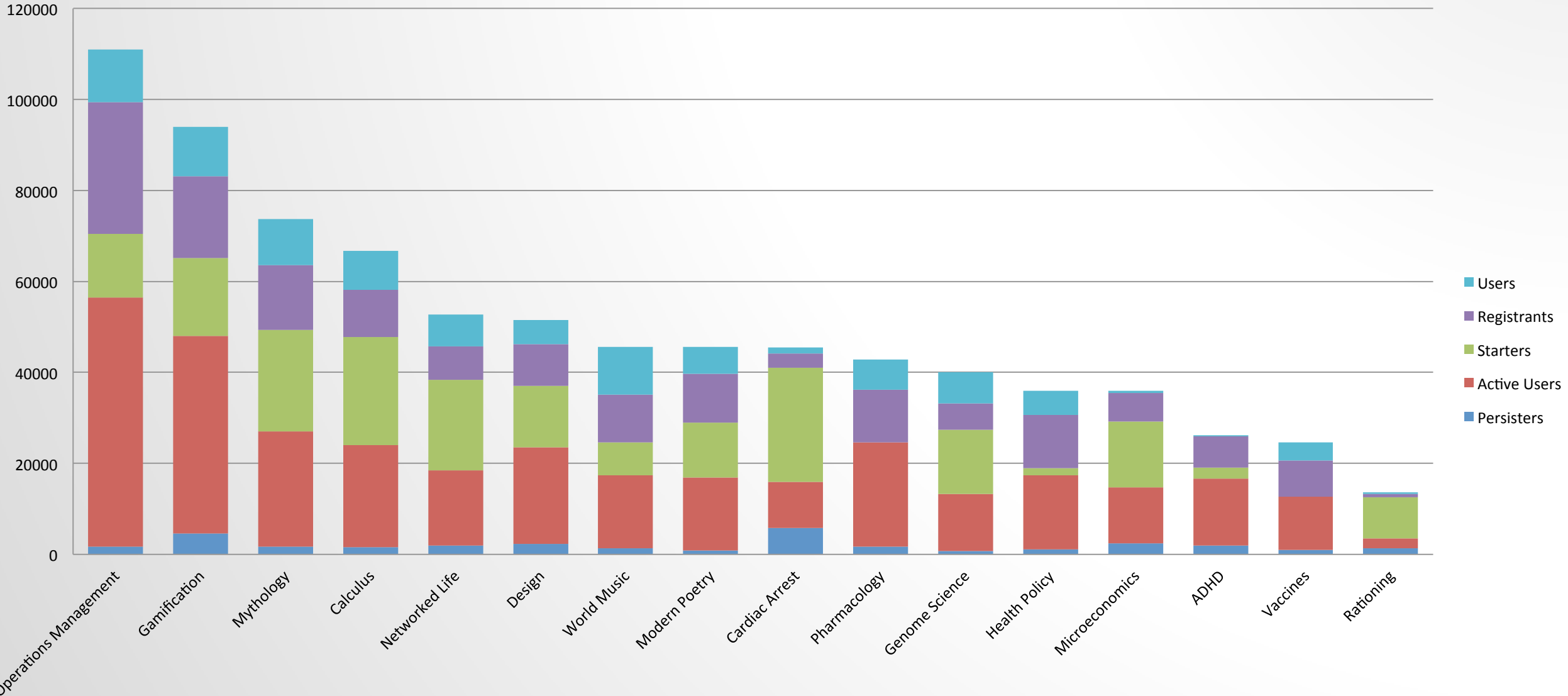
Population:

- Users
- Registrants
- Starters
- Active User
- Persister

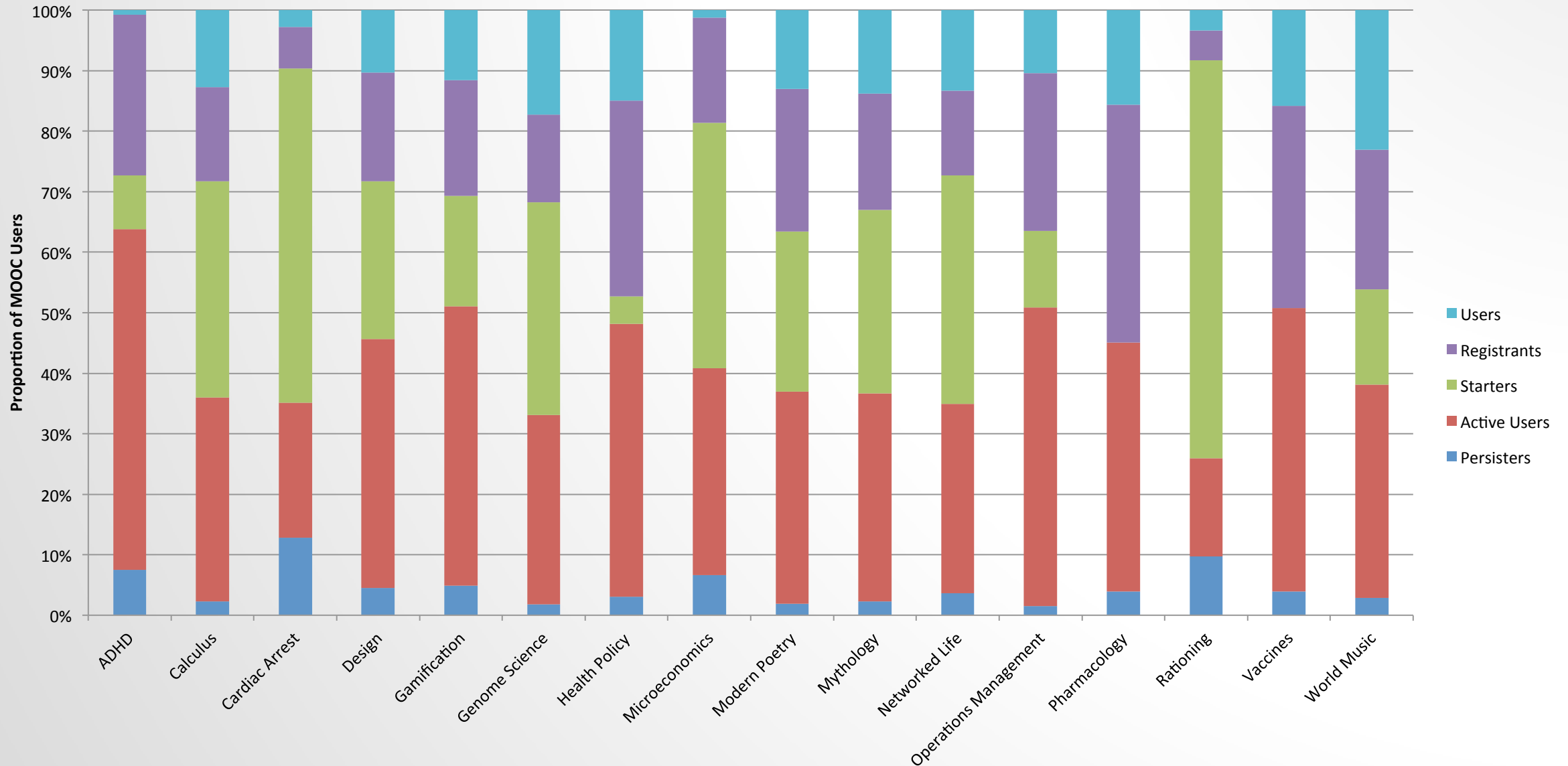
Engagement / Persistence:

- View Lecture
- Take Quiz
- Course Grade Above 80%
- Time of Last Access

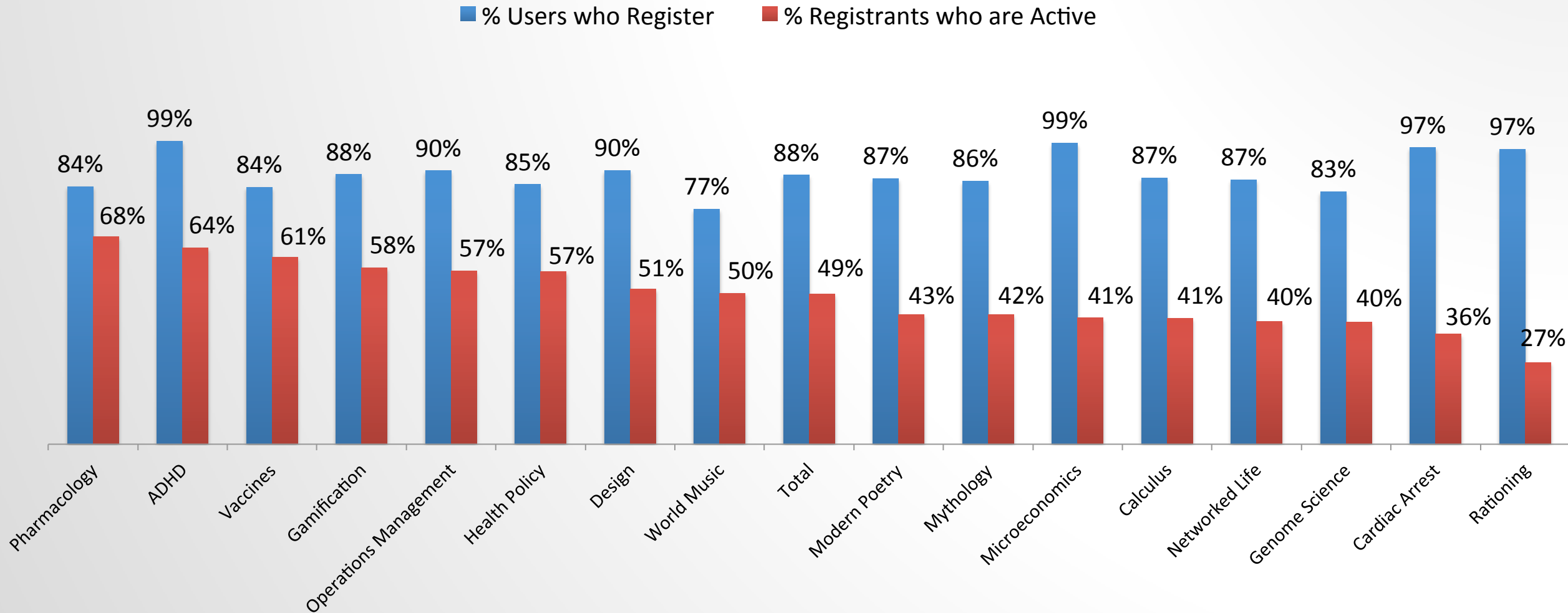
Variation in Number of Participants by Course



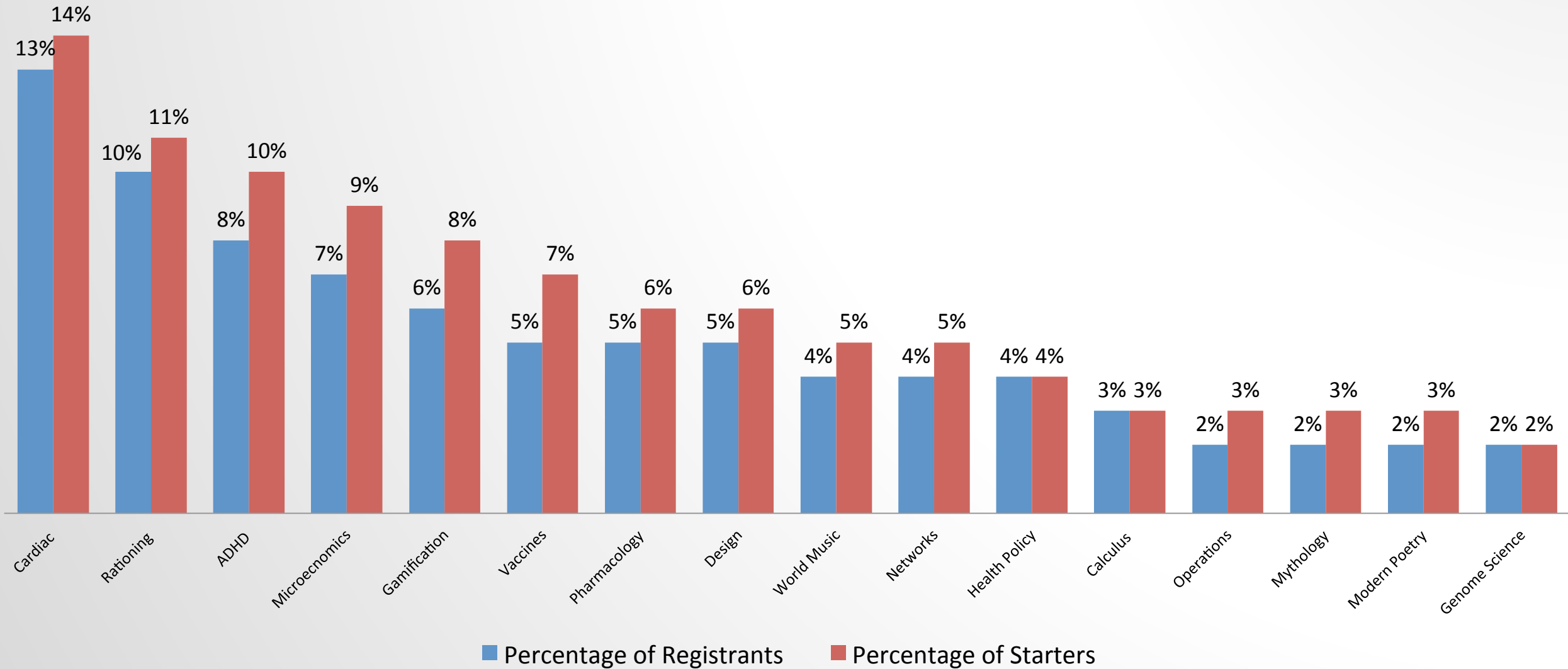
Variation in Distribution of Participants



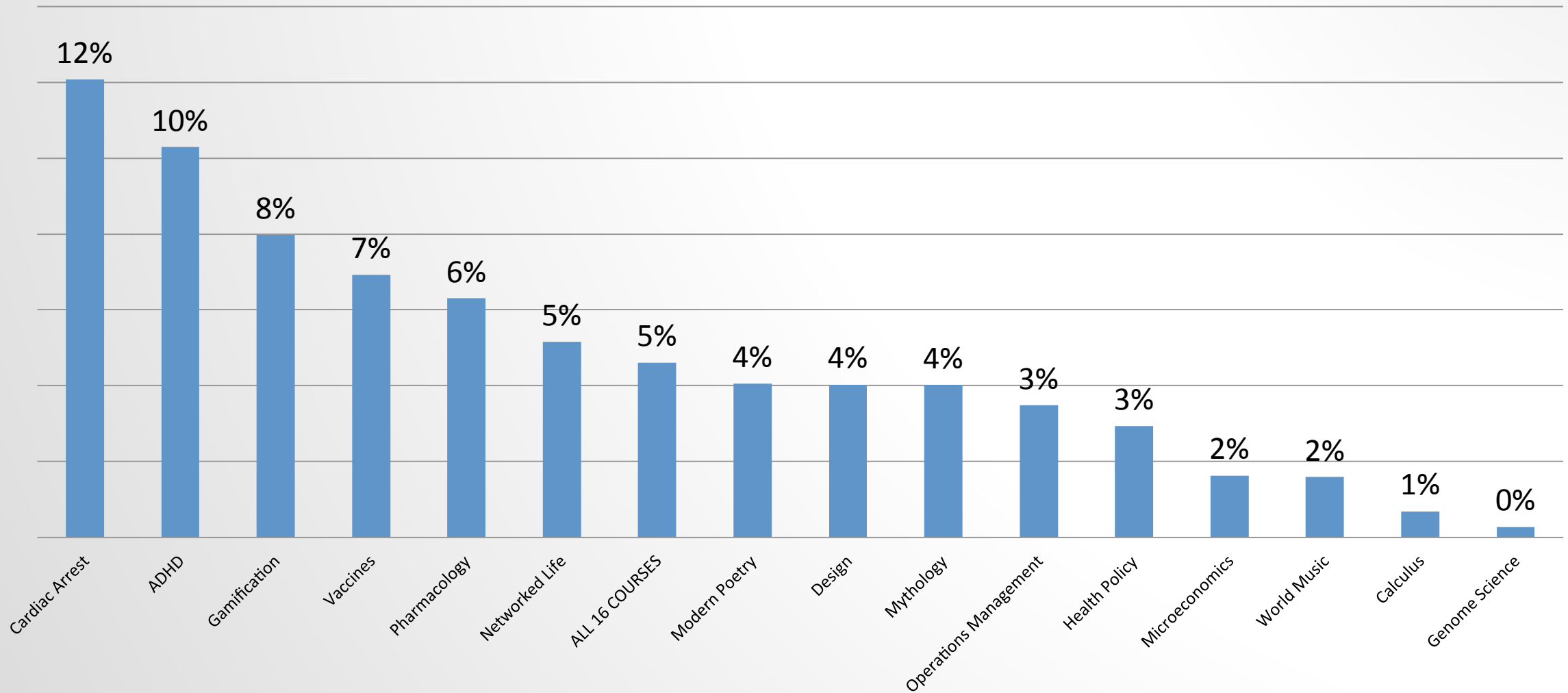
Variation in “Engagement” By Course



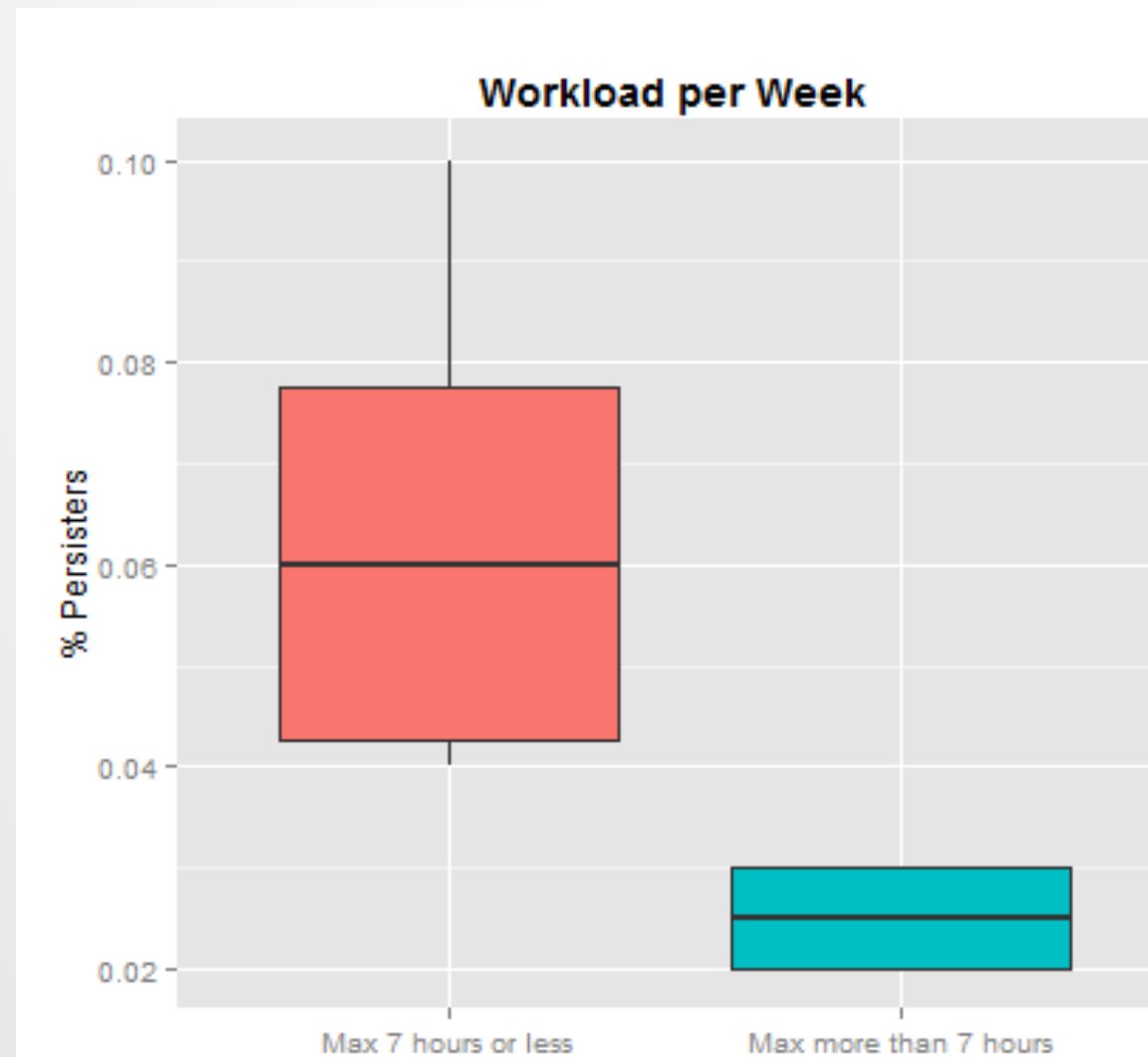
Persistence Rates: Percentages of Registrants and Starters Who Last Accessed Course Within One Week of Course End



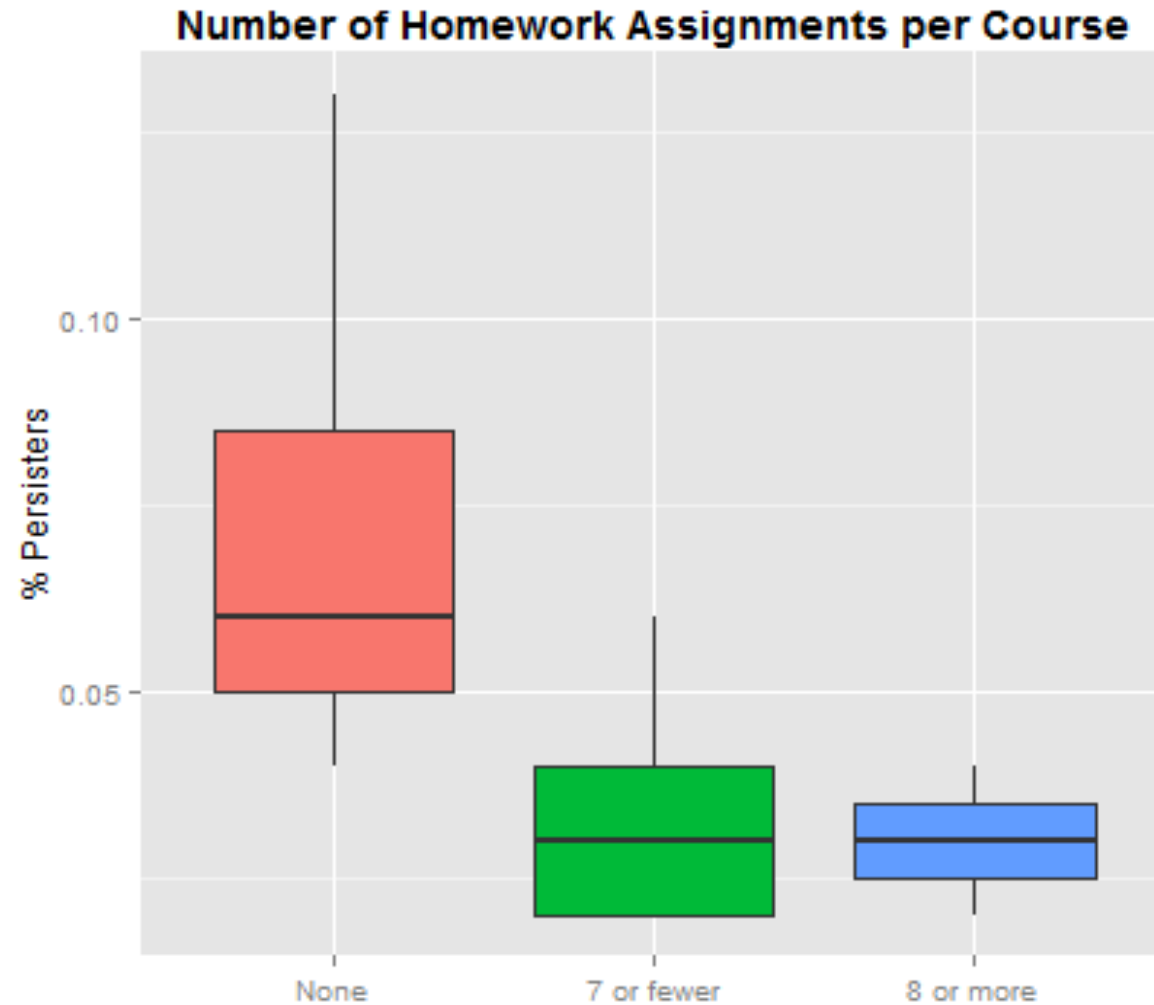
Percentage of Registrants with Final Grades Above 80%



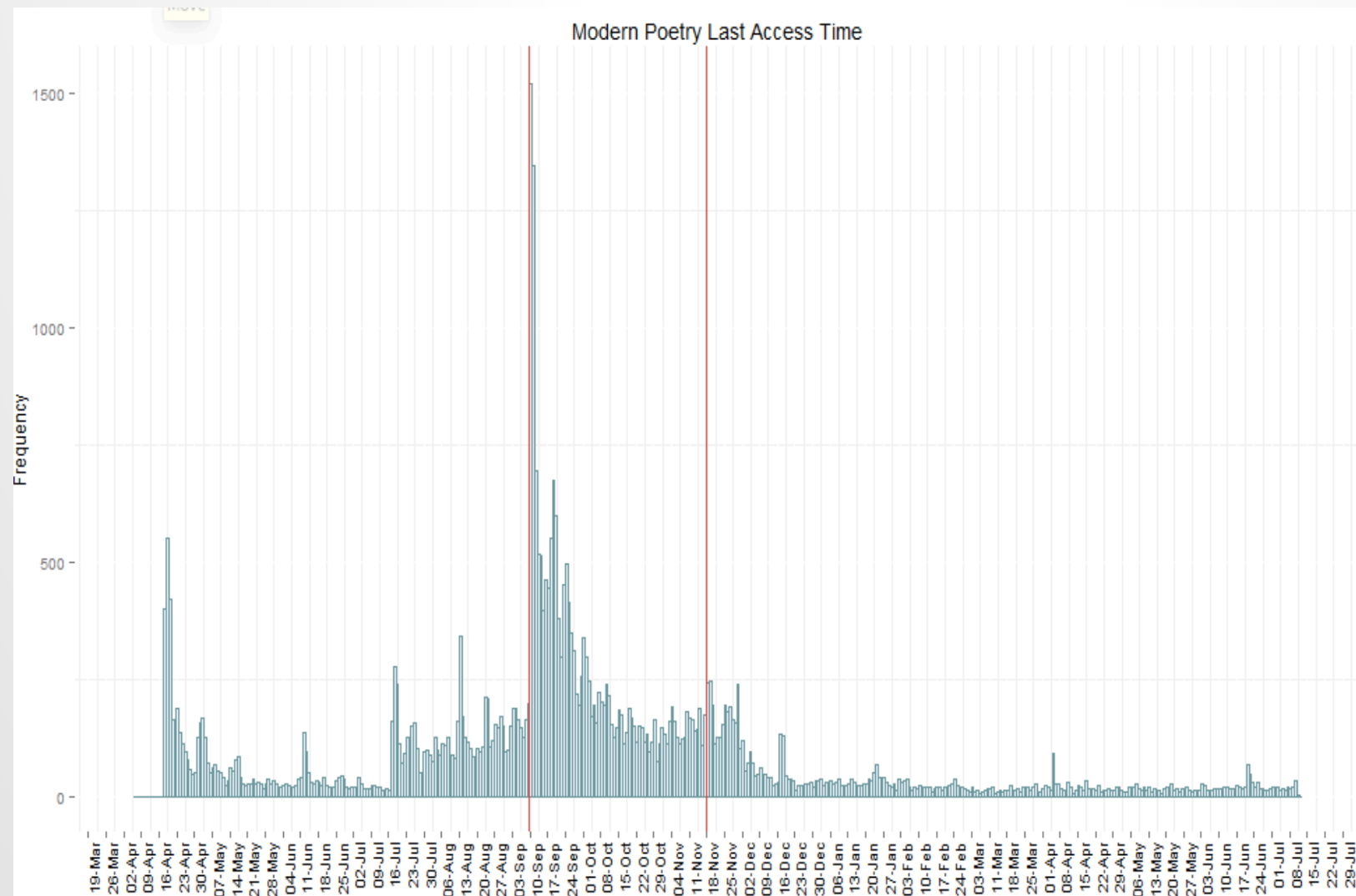
Percentage of Registrants Who Persist by Expected Workload



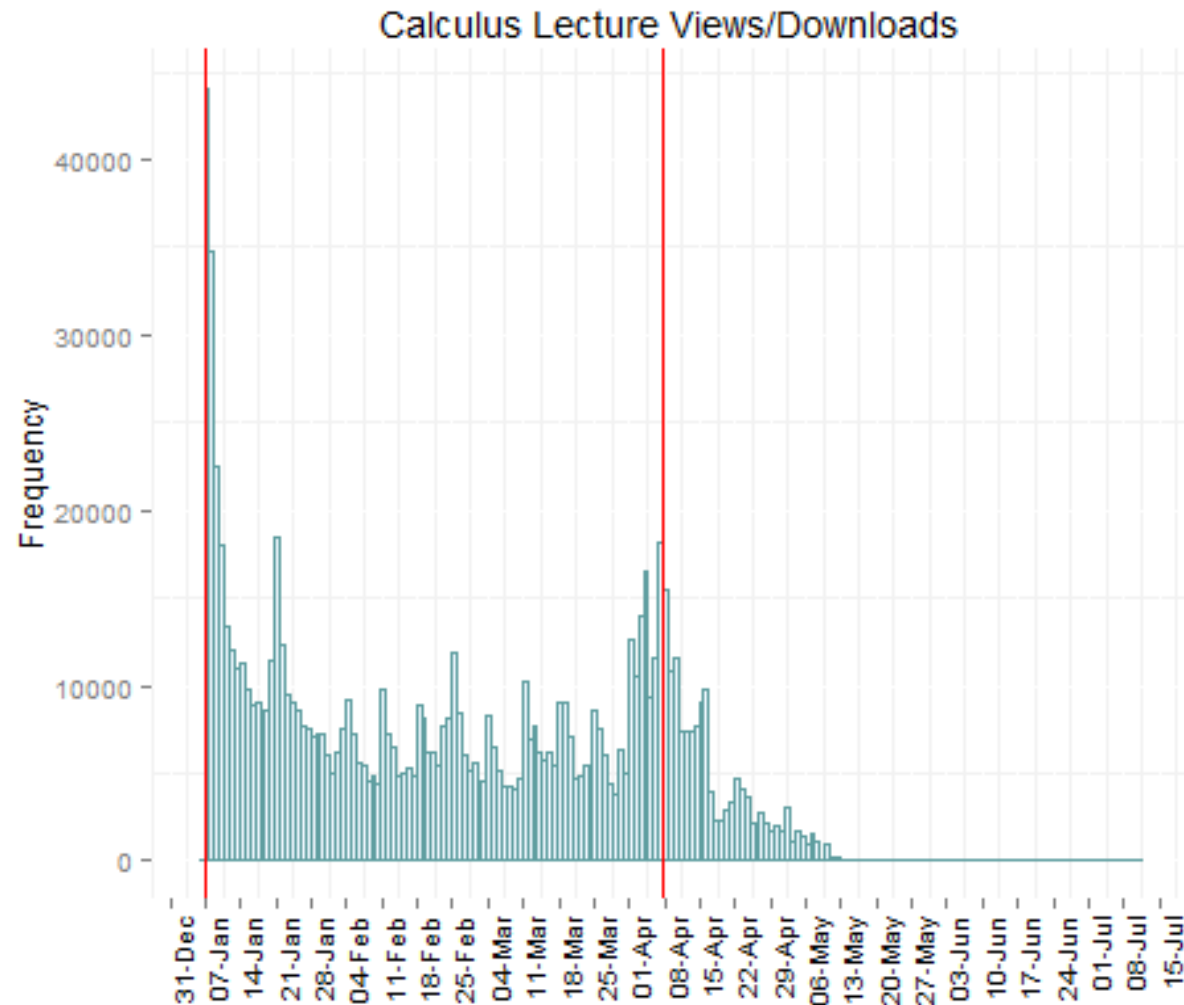
Percentage of Registrants who Persist by Number of Homework Assignments



Example of Pattern of “Persistence” Over Time

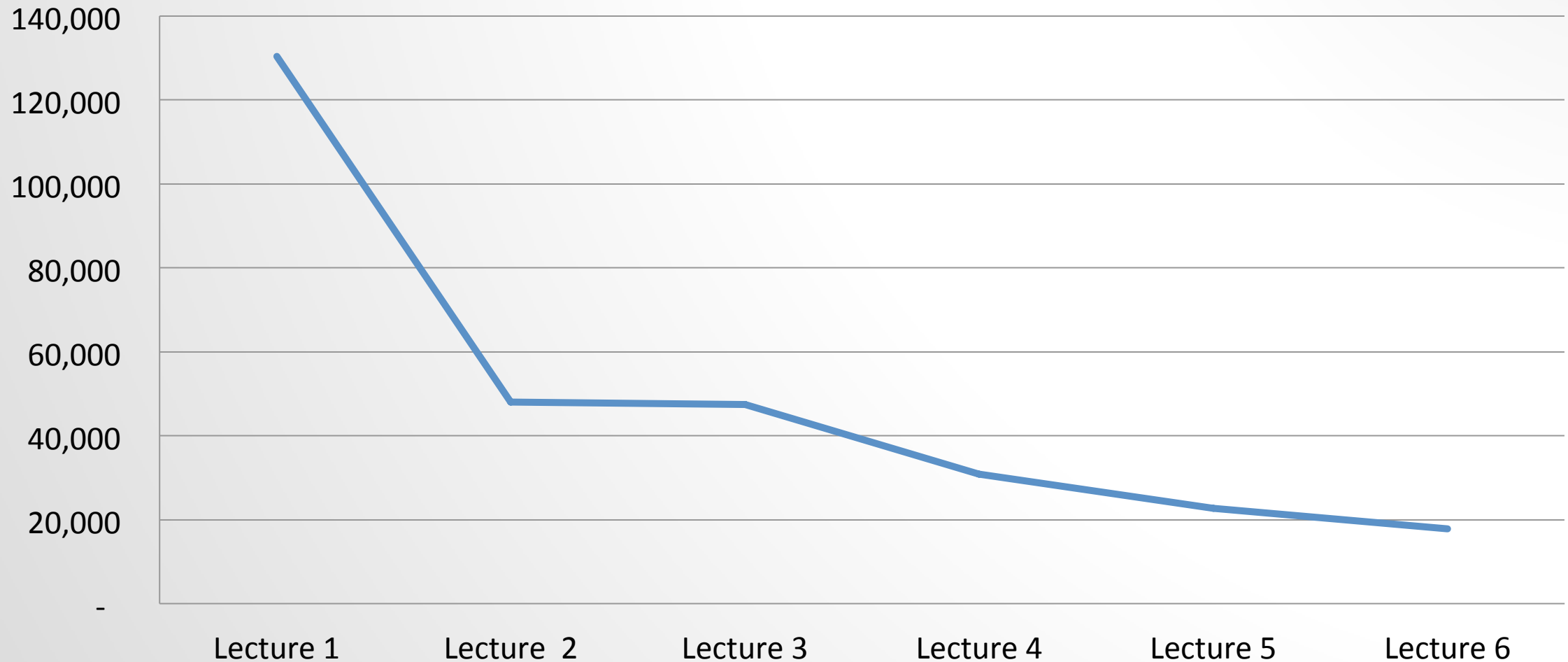


Number of Lecture Views by Day (Calculus Course as an Example)

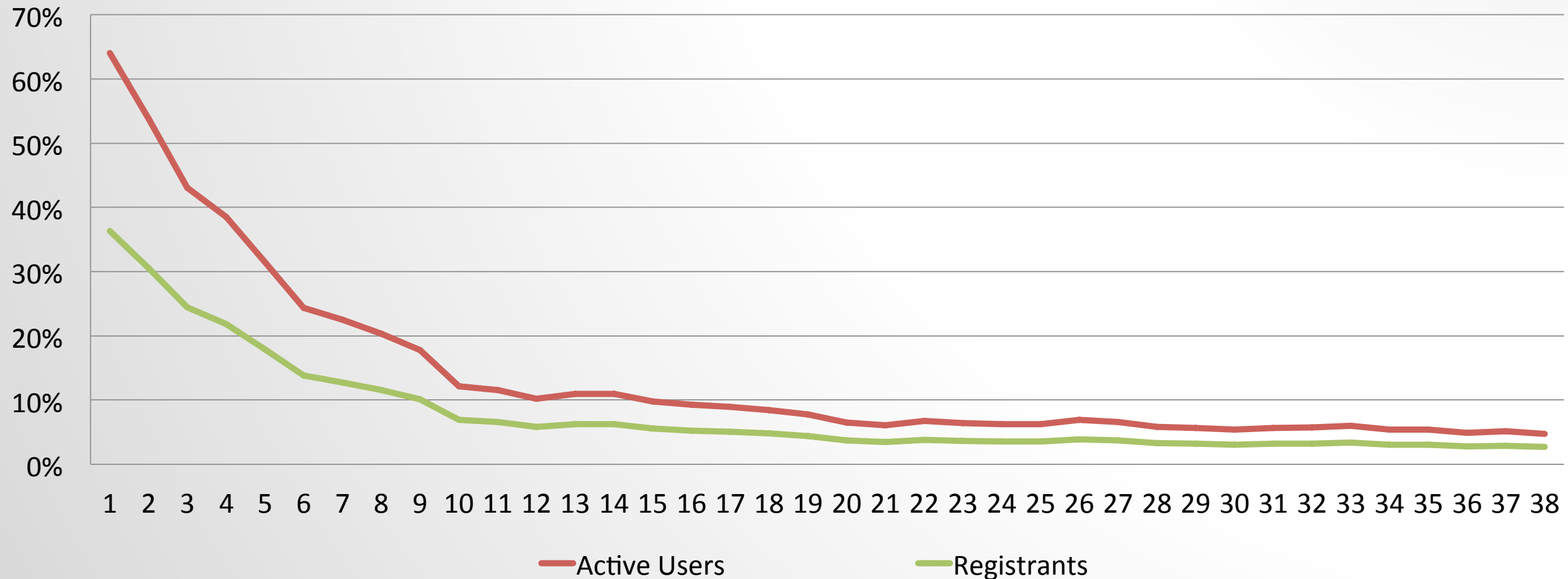


Number of Quizzes Submitted by Lecture

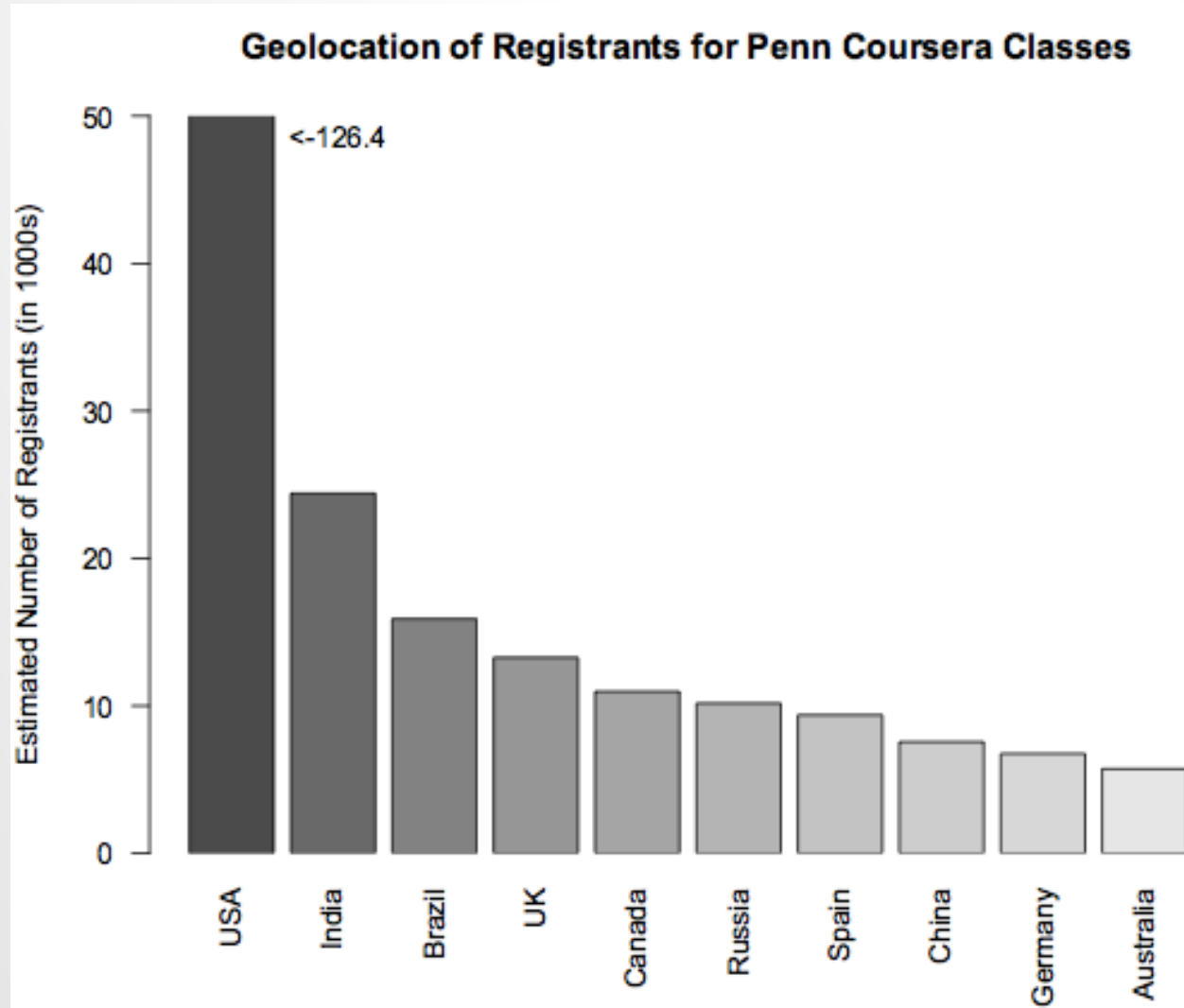
Introduction to Operations Management Course



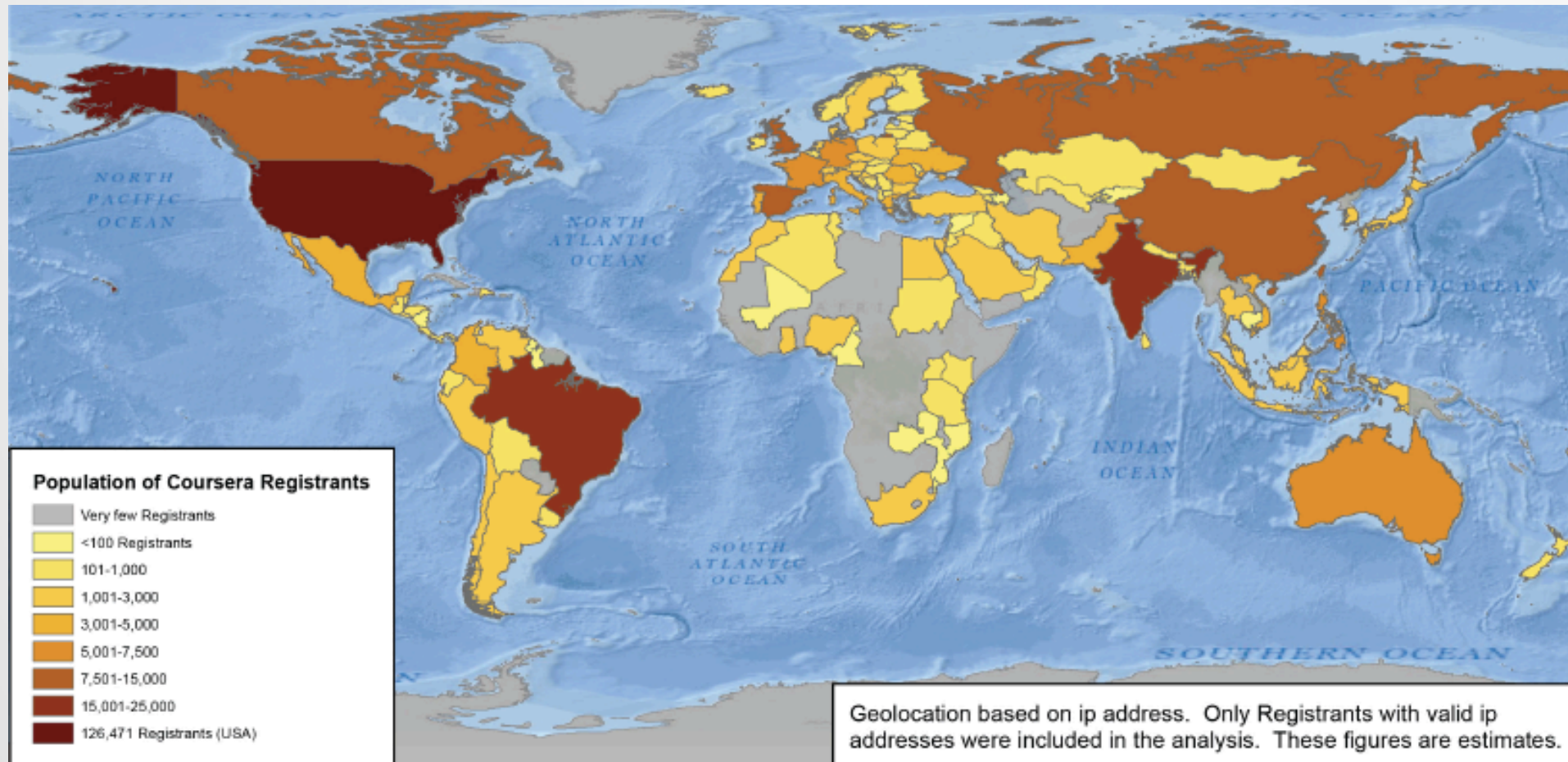
Percentages who Submitted Quizzes by Quiz Number (Operations Management Course as an Example)



National Affiliation of Users (Using IP Addresses)



Geolocation of Registrants



Numerous Data Challenges

Inconsistent and incomplete information about:

- Variable definitions
- Coding of data for each Coursera course
- Characteristics of course offerings, instructional approaches, etc. (from syllabi)
- “Engagement” (from syllabi or Coursera data)

Emerging Conclusions

- Many “apply” but:
 - Few active users
 - “Engagement” falls off dramatically after first 1-2 weeks
 - Few “persist” to course end
- Variations across courses
 - Course characteristics
 - Course outcomes
- Users from many locations but most from U.S.
 - Disproportionately educated, male, wealthy (Emanuel, 2013)

Continuing and Future Research

Variations across groups:

- Demographic groups (e.g., geographic location)
- Single versus multiple course users

Course engagement and learning

- Best measures of student engagement
- Instructional approaches to engaging users
- Instructor / peer feedback on performance

Differences in patterns between:

- First-generation courses and later versions

Discussion

