

Spotlighting Learning Analytics: An Improvement Tool for Online Engineering Courses

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Learning analytics provide insight into the black box of online learning

“Learning analytics is the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs.” – 1st International Conference on Learning Analytics and Knowledge (LAK)¹

Purdue



Early warning system that predicts at-risk students²

UMBC



Blackboard
Track performance and predict student success³

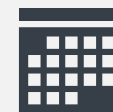
Researchers



Course discussions to explore student learning communities^{4,5}

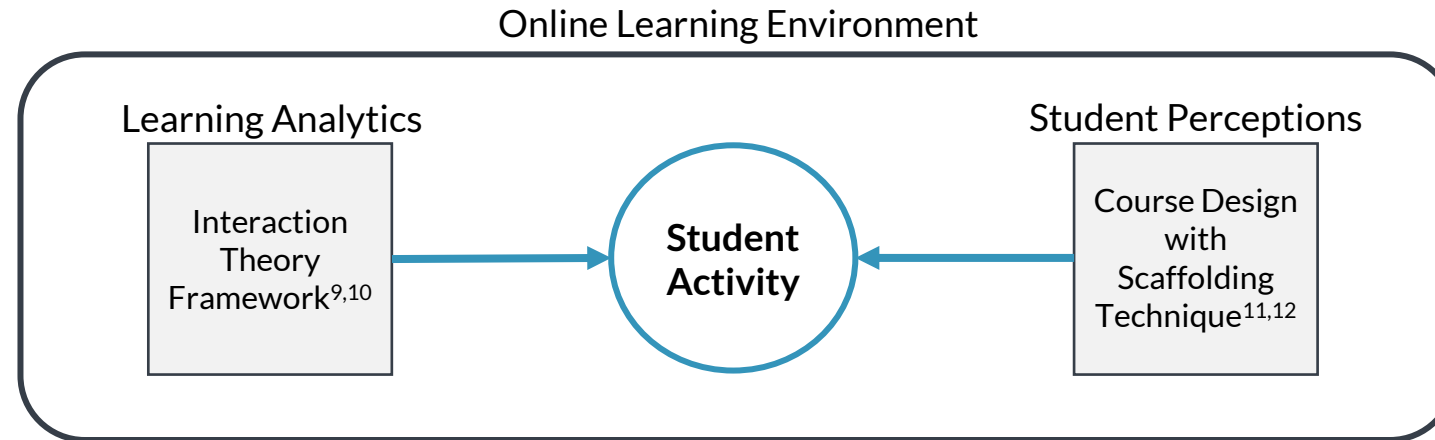


Identifying preferred instructional materials^{6,7}



Identifying popular course engagement times⁸

Due to the lack of learning analytics theory, this study is grounded in the theory of social constructivism.



RQ 1: In what ways can learning analytics describe student activity in an online engineering course?

RQ 2: To what extent do the students' perception of the content correlate with their activity?

To explore the utility of learning analytics in an online platform, the researchers conducted a multiple-case study¹³ with a convergent mixed-methods approach¹⁴.



Online Construction Management

Spring 2020

Summer 2020

Fall 2020

RQ 1



Learning Analytics

Collection and Analysis

RQ 2



Survey

Collection and Analysis



Interpret
Results to
Compare

Course design and layout affects the learning analytic data collection.

Instructional Format:
Asynchronous with online
synchronous TA &
Professor office hours



Five Modules

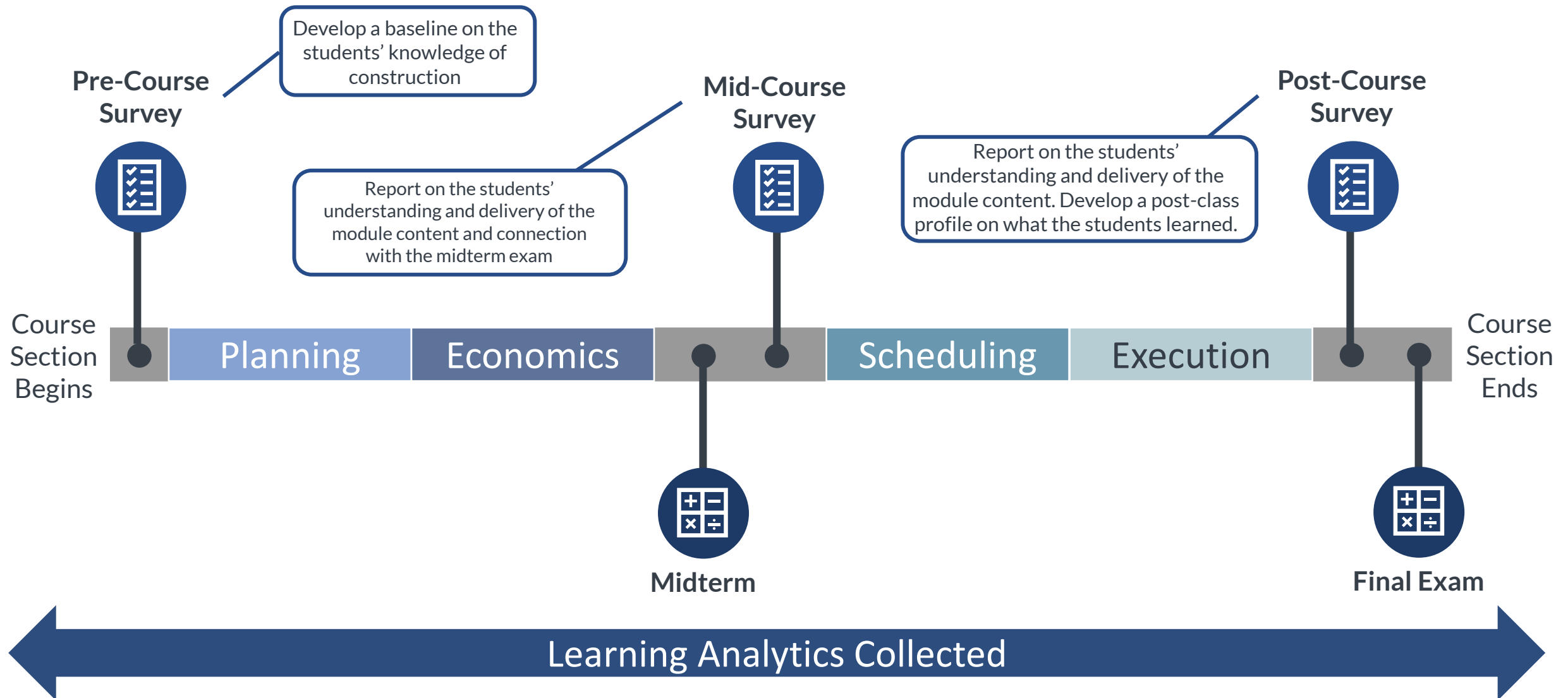
Planning, Economics, Scheduling,
Execution, Leadership

Weekly Modular Format

Video Lectures, Discussion
Board, Homework, Project
Assignment

▼ Planning III & IV		Prerequisites: Planning I & II	✓	+	⋮
Housekeeping 3			✓		⋮
Planning III: Project Delivery	Lecture		✓		⋮
Project Delivery - Discussion	Activity/Discussion		✓		⋮
Checkpoint 4			✓		⋮
Marvel Bids!			✓		⋮
Bid Document Mar 1 0 pts	Project Assignment		✓		⋮
Planning IV: Contract Types/Methods	Lecture		✓		⋮
Contract Types - Discussion	Activity/Discussion		✓		⋮
CEE 3014 - H3SuppReading.pdf			✓	🔄	⋮
Checkpoint 5			✓		⋮
A2: Getting Started Feb 9 100 pts	Homework		✓		⋮

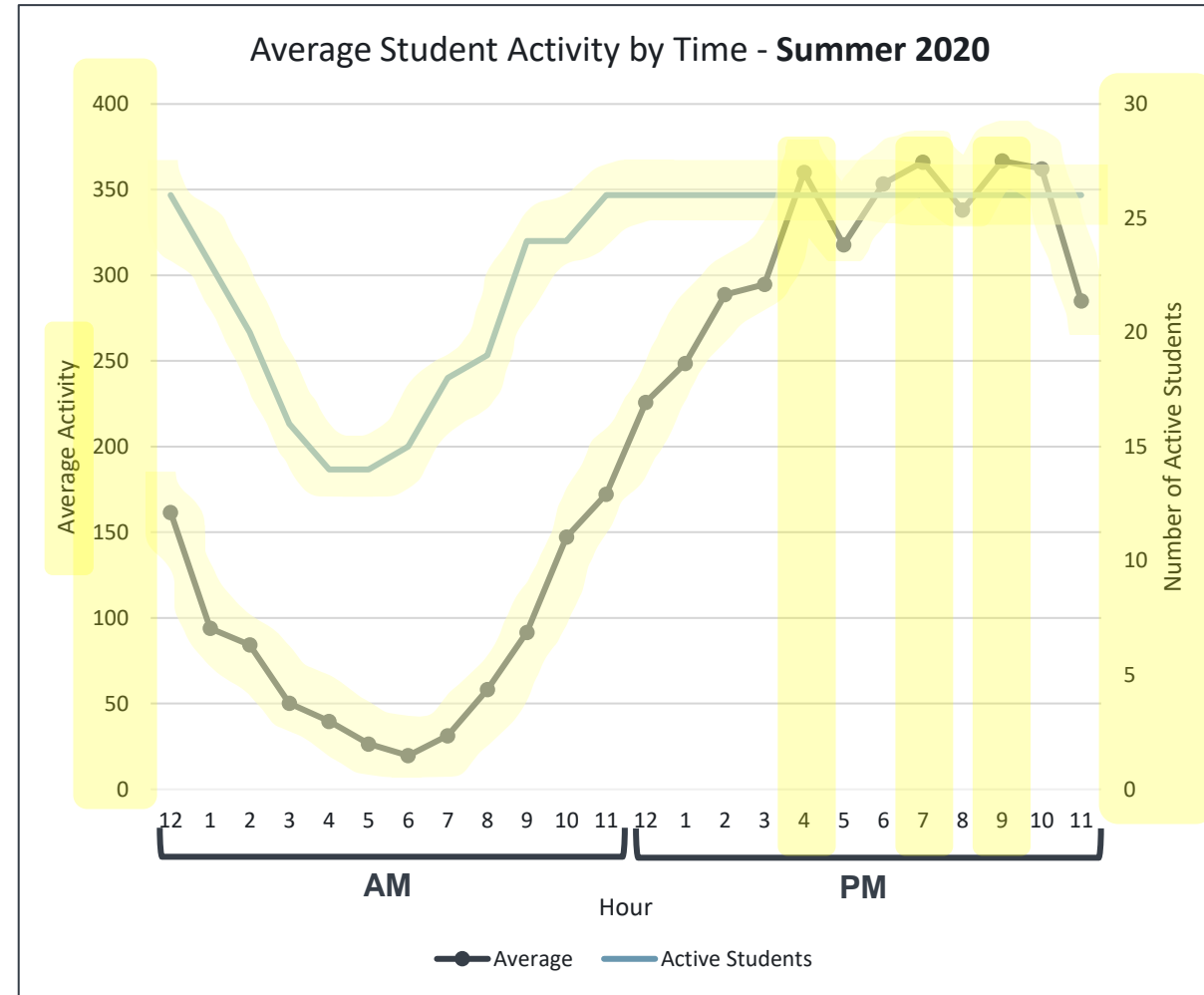
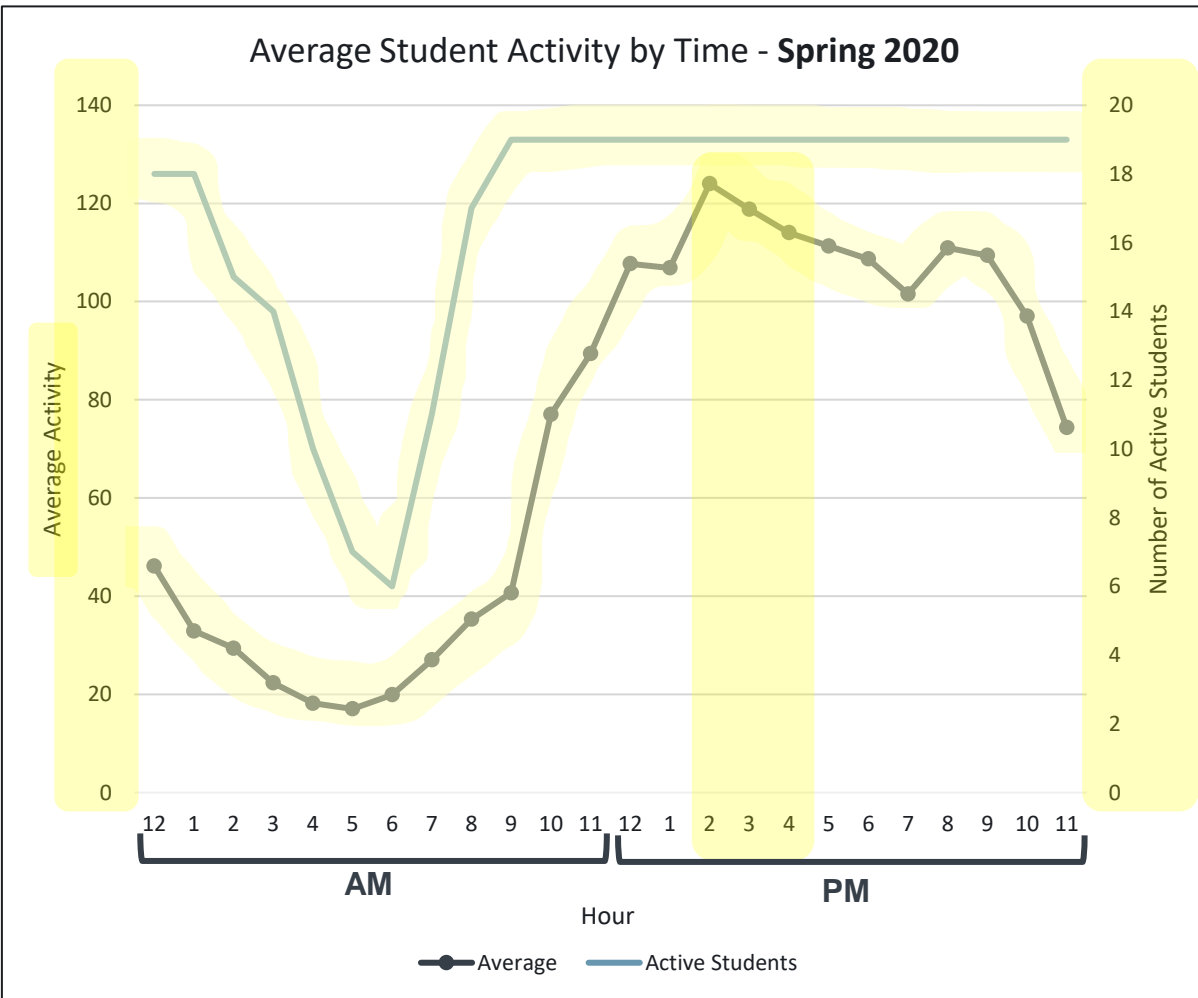
Data collection occurred during the course delivery process.



Using student activity by hour, an instructor can identify peak times to engage with their students.

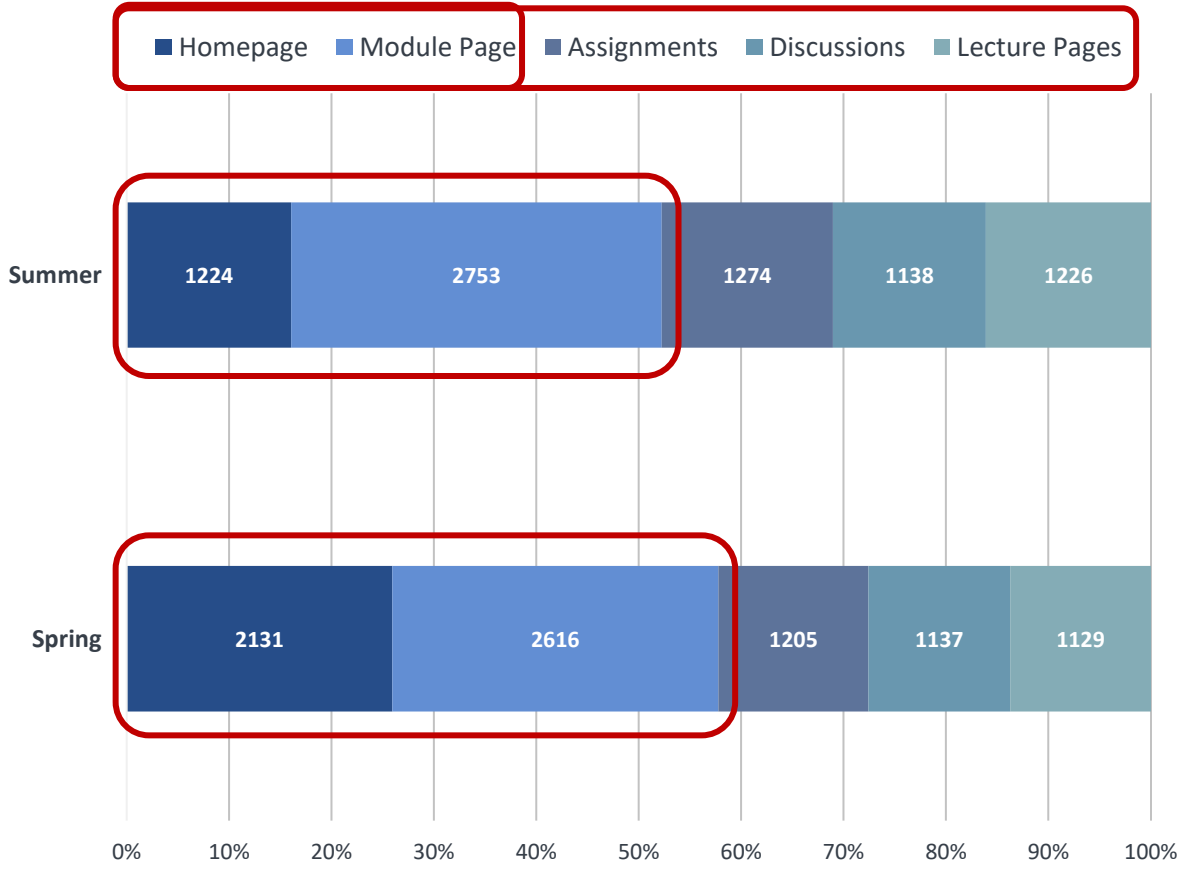
Spring 2020

Summer 2020

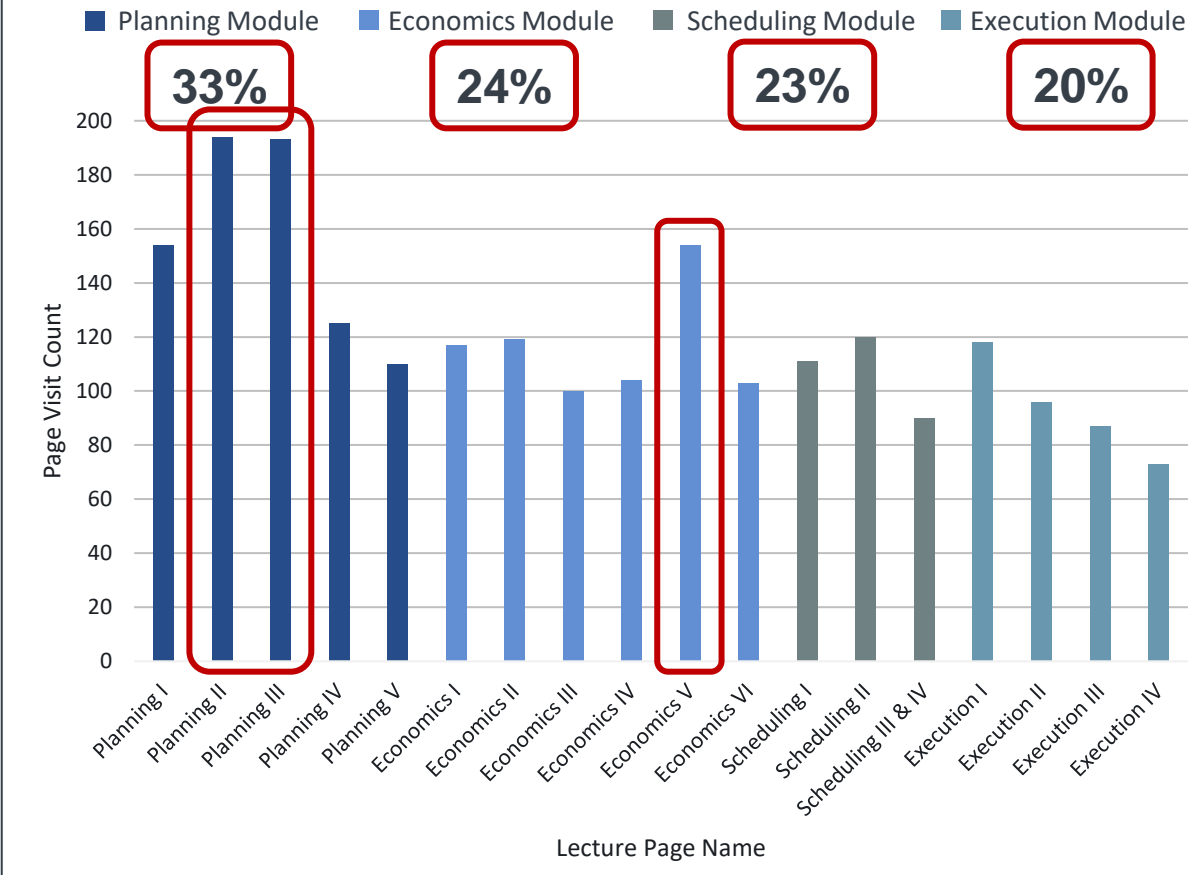


Page visits are critical for student interaction

Total Page Visits Distribution



Total Lecture Page Visits by Page - Combined



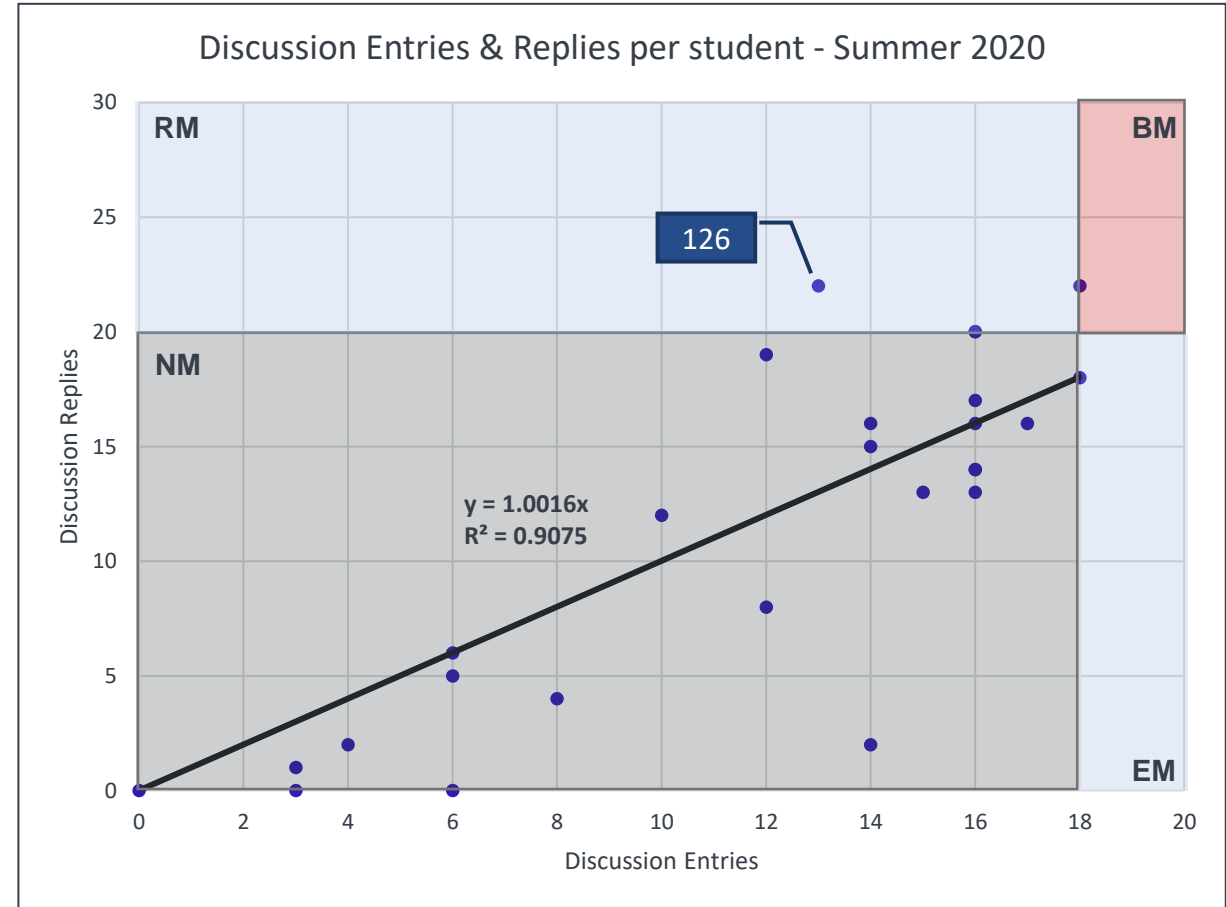
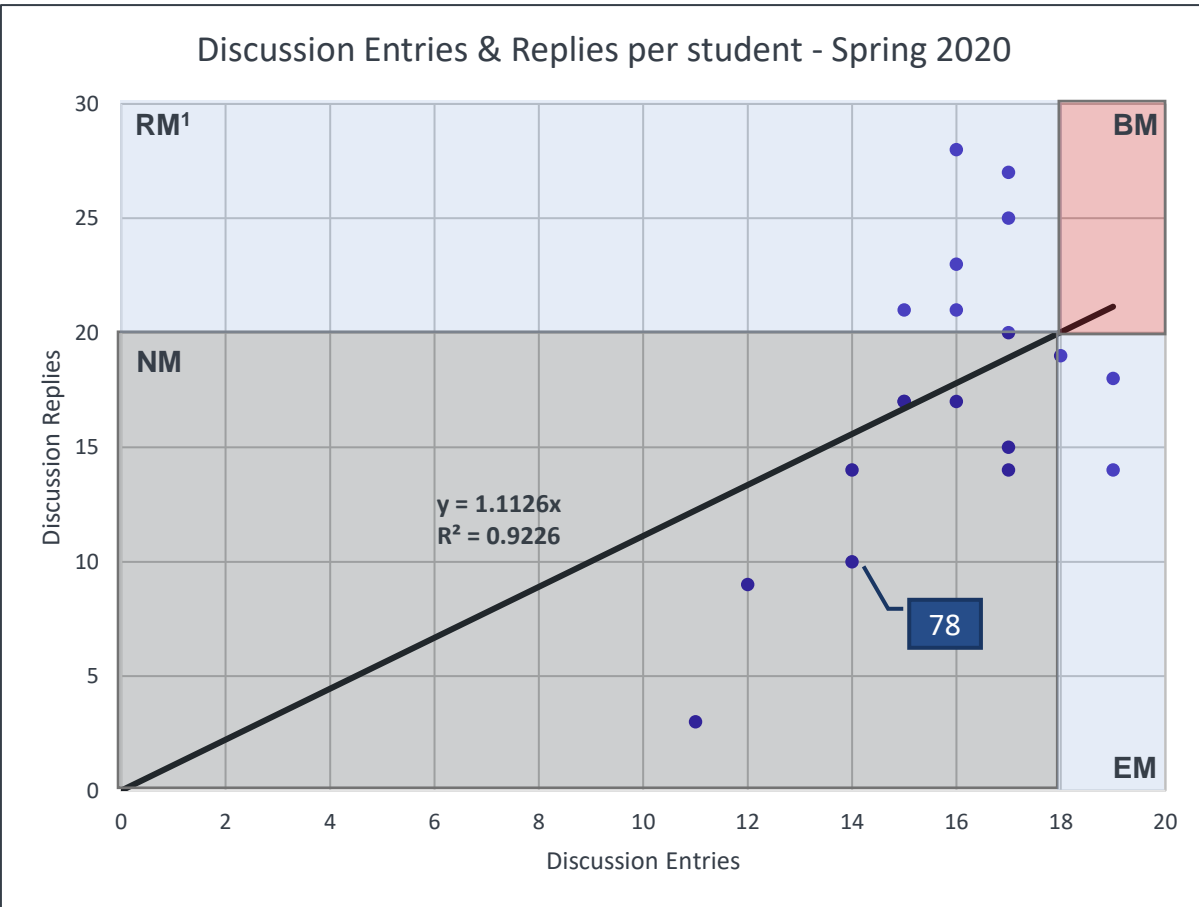
Students need a discussion post to reply to.

R = 0.568, p < 0.05

Spring 2020

Summer 2020

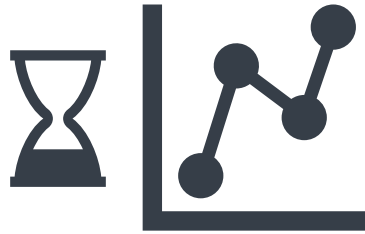
R = 0.840, p < 0.001



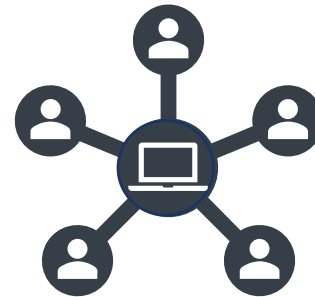
¹ NM = met no minimums, RM = met reply minimum, EM = met entry minimum, BM = met both minimums

Learning analytics describe student activity through:

Popular activity
times



Course page visit
frequency



Student discussion
interaction with
their peers



How will you use learning analytics?

Questions?

Acknowledgements

CHEP



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