

In tune with



the Future of
Digital & Distance Learning

Registration now open!

USDLA National Conference
Nashville, Tennessee
May 20 - 23



Broadway, Nashville

Learning Analytics for Mere Mortals

Robert Zotti, PhD
Assistant Dean, WebCampus
Stevens Institute of Technology
rzotti@stevens.edu

Wendy Pate
Assistant Director, WebCampus
Stevens Institute of Technology
wpate@stevens.edu



Prolog

The elevator repairman came to Stevens...
and shattered my confidence in Canvas

The elevator logs showed...

- When it went up
- When it went down
- Which floors it stopped on
- When the emergency button was pressed
- The telemetry from 2 dozen safety features

There was better information available from the elevator logs than there was from Canvas!



Learning Analytics Defined

“...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.”

Wilson, Mark, Gochyyev, Perman and Scalise, Kathleen. “Assessment of Learning in Digital Interactive Social Networks: A Learning Analytics Approach.” *Online Learning* -20(2), June 2016.



A Matter of Context

- The course level
 - Which students are doing better than others and why?
- The program level
 - What courses are doing better than others and why?
- The student level
 - Student performance
 - Student retention
- The instructor level
 - What is working in the course?
 - Which designs work the best?

A Matter of Context

- Data mining techniques assume you have....
a data mine





A Matter of Context

- The type and variety of course assets makes deciding on metrics hard
- The 3 questions to ask before adopting learning analytics:
 - What information?
 - How is it gathered?
 - How is it combined?
 - <https://www.youtube.com/watch?v=Sanf-2JAg1w>

A Matter of Context



What analytics can we use or develop without an army of data scientists?



Today's Focus

Creating a data warehouse of hundreds of thousands of clicks & touchpoints of class participants

Analyzing system logs with a limited scope of questions in mind

- Early warning of signs of trouble (from a program management perspective)
 - Courses not ready for semester
 - Students not logging on
 - Tools not being used

Stevens Celebrates 20 Years Online



Term	Online Sections	Enrollments
Spring 2000	2	17
Spring 2019	139	2566



2015



2013



2011



2010



2008



2007



2005



2003



Current Operations

18 Online Masters Degrees,
120-140 Online classes per semester

Engineering

Management

Computer Science

A Wide Variety of Courses...



Electrical Engineering

EE507	Intro Microelectronics/Photonics
EE548	Digital Signal Processing
EE561	Solid State Electronics I
EE585	Phys Design of Wire Comm Sys
EE591	Intro to Multimedia Networking
EE592	Comp & Multimedia Network Security
EE603	Linear System Theory
EE605	Probability & Stochastic Proc I
EE612	Principles of Multimedia Compression
EE654	Design & Anal of Network Systems
EE690	Introduction to VLSI Design
EE691	Information Systems Security

Mechanical Engineering

ME510	Power Plant Engineering
ME511	Wind Energy-Theory & Application
ME513	Intro to Nuclear Engineering
ME518	Solar Energy-Theory & Application
ME554	Intro Computer-Aided Design
ME555	Lean Six Sigma
ME623	Design of Control Systems
ME641	Engineering Analysis I
PME530	Intro to Pharma Manufacturing
PME531	Process Safety Management
PME535	Good Mfg Practice in Pharma
PME540	Validation in Pharma Mfg
PME560	Quality in Pharm. Manufacturing
PME628	Mfg. & Packing of Pharm OSD Products

A Wide Variety of Courses...



Computer Science

CS501	Intro to JAVA Programming
CS514	Computer Architecture
CS522	Mobile Systems & Applications
CS526	Enterprise & Cloud Computing
CS545	Human-Computer Interaction
CS546	Web Programming
CS550	Computer Organization & Programming
CS553	Intro to Text Mining
CS554	Web Programming II
CS555	Agile Methods for SW Dev.
CS557	Intro to Language Processing
CS561	DBMS I
SSW540	Intro to Software Engineering
SSW567	Software Testing

Management

BIA660	Web Mining
MGT620	Statistical Models
MGT630	Global Business and Markets
MGT635	Managerial Decision-Making
MGT641	Marketing Management
MGT657	Operations Management
MGT663	Entrepreneurial Discovery
MGT671	Technology & Innovation Mgt
MGT689	Org Behavior & Design
MIS630	Data & Knowledge Mgmt
MIS636	Data Warehousing/ Bus. Intel.
MIS637	Knowledge Discovery DB I
MIS699	Managing Emerging Info Tech
MIS710	Process Innovation Mgmt
MIS730	Integrating IS Technologies

Analytics and the Adoption of the OLC Scorecard

Benchmarking tool with 70 “quality attributes”

- Requires formalization of critical dimensions of online programs
 - Institutional Support
 - Technology Support
 - Course Development & Instructional Design
 - Teaching & Learning
 - Faculty & Student Support
 - Evaluation & Assessment

- Opportunity to expand/formalize existing analytics



OLC Scorecard Adoption

Lessons learned from enhancing the first few courses



Use of...	MGT609	MGT606	MGT657	BIA662	MGT612
Discussion Boards	Weekly	None ?	?	3	Weekly
Powerpoint Slides	*Weekly	*Weekly		14	
Video	~6 segments; ~30 minutes total**	None	Weekly (lecture capture, 1-hr each)	21	None (?)
Quizzes		Extensive***		1	None
Papers/PDF	2			147	2
Team projects	2	0	?	?	?
Math-intensive homework					
Web conferencing	1-2 times	Weekly	?	weekly	0-2 times

* Converted from publisher slides

** Includes free videos available via YouTube

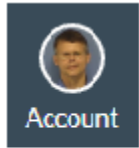
*** Publisher-provided



Taking Inventory

“Module” view elements	BIA662	MGT612	MGT699
Canvas Assignment pages	11	2	6
Canvas Content Pages	0	1	11
Discussion Boards	3	17	1
DOC files	7	39	2
Labels	52	80	13
Links	123	3	0
PDF files	147	25	8
PPT files	14	16	14
XLS files	7	1	1
ZIP files	63	1	0
MP4/AVI files	21	0	19
Other	12	0	1
Grand Total	460	186	76

Canvas System Reports



Account

☰ Stevens Inst. Tech. > Settings



Admin

Settings

Quotas

Notifications

Admins

Announcements

Reports

Apps

Course Storage

Grade Export

LTI Report

Last Enrollment Activity

Last User Access

MGP Grade Export

Outcome Export

Outcome Results

Provisioning

Public Courses

Recently Deleted Courses

SIS Export

Student Competency

Students with no submissions

Unpublished courses

Unused Courses

User Access Tokens

Zero Activity

The Course Storage Report



SIS Id	Short Name	Name	Storage used in MB	Sum of all files in MB
10346.2019A	Adv Sys & Software Arch. Model/A	2019A SYS -750-WS	0	0
10144.2019A	Adv. Digital Signal Processing	2019A EE -664-WS	0	0
10186.2019A	Advanced Derivatives	2019A FE -680-WS	0	0
10327.2019A	Agile Methods for Software	2019A SSW -555-WS	43.31	1038.64
10098.2019A	Agile Methods for Software	2019A CS -555-WS	0	0
10090.2019A	Algorithms	2019A CS -385-WS	0	0
10508.2019A	Algorithms	2019A CS -385-WS	0	0
10073.2019A	Algorithms	2019A CPE -590-WS	0	0
10104.2019A	Algorithms	2019A CS -590-WS	0	0
10287.2019A	Analytical Methods for Networks	2019A NIS -604-WS	0	0
10075.2019A	Analytical Methods for Networks	2019A CPE -604-WS	0	0
10540.2019A	Comp Organization & Prog	2019A CS -550-WS	3.59	3.59
10185.2019A	Computational Methods in Finance	2019A FE -621-WS	0.09	0.09

The Zero Activity Report



Name	course sis id	course name
Nevola, Bruce	11908.2019S	2019S MGT -657-WS
Kidd, Cullen	11816.2019S	2019S EE -584-WS
Greene, Erik	11982.2019S	2019S SSW -533-WS

Data Concerns



- Define appropriate times for analyzing different logs
 - Beginning/middle/end of term
 - Perpetually
- Note the “expiration date” of your logs
 - Snapshots only good for a couple of days*

A Question of Balance



1: “An inch wide and a mile deep”



2: “A mile wide and an inch deep”

<http://www.caltech.edu/news/rover-findings-indicate-stratified-lake-ancient-mars-78502>

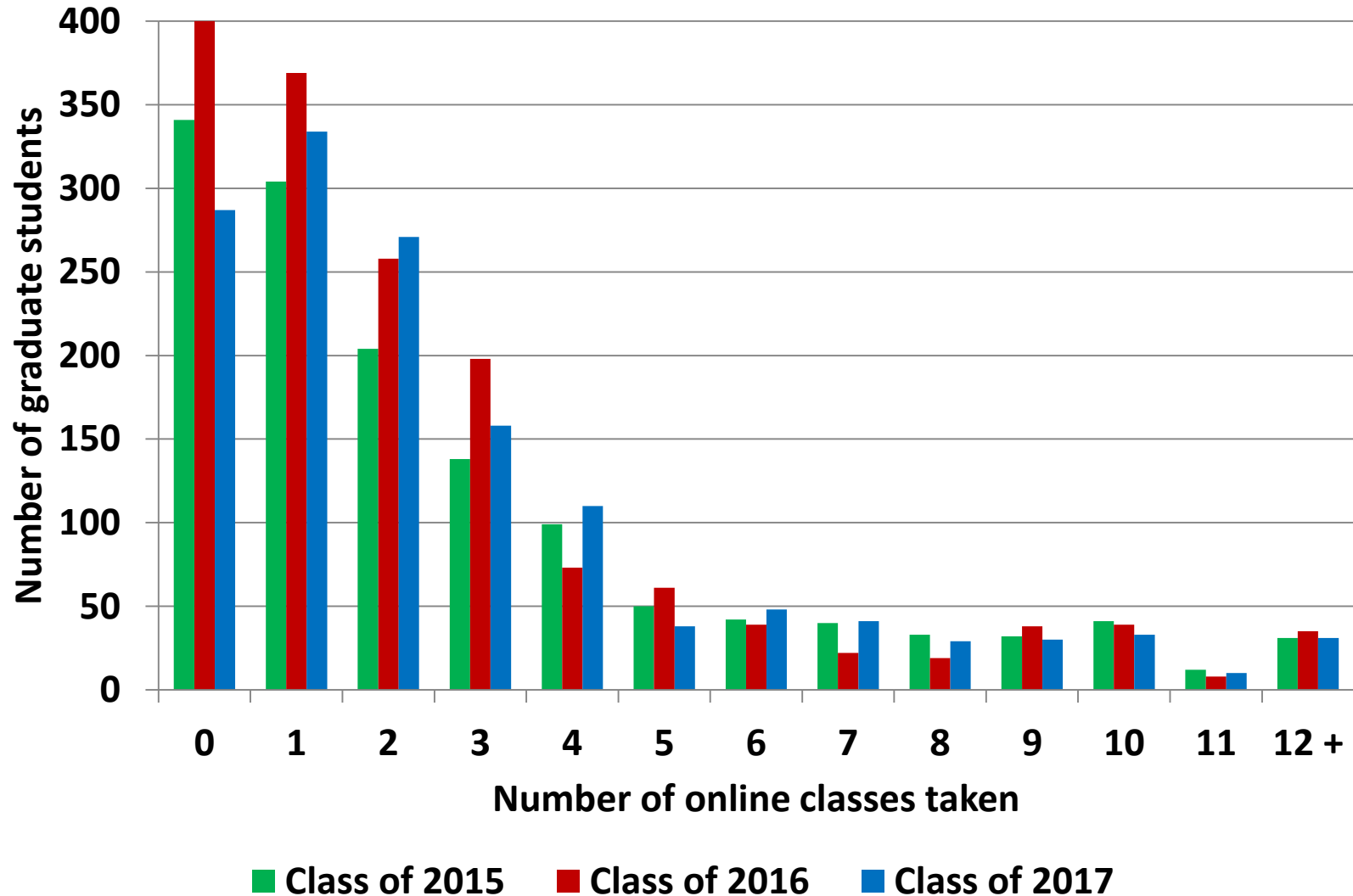


The Low-Hanging Fruit

**Things we're already (reasonably)
good at**

Graduates of Classes 2015, 2016, and 2017

How many online courses did they take?





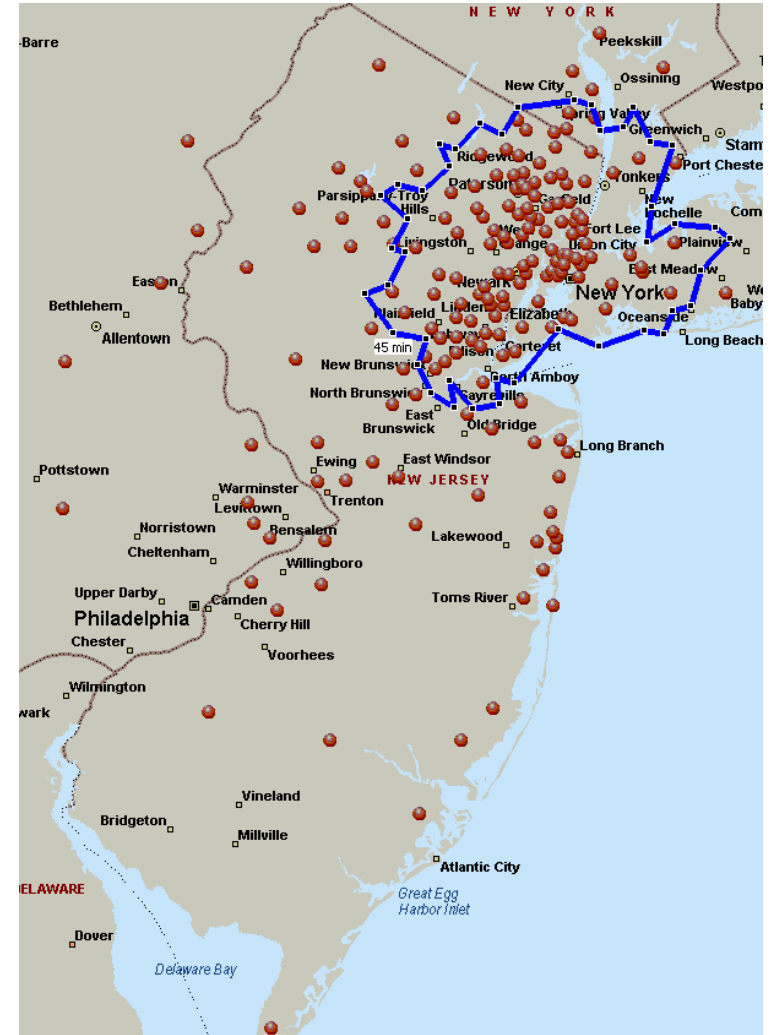
Enrollment Report - Geographic Analysis



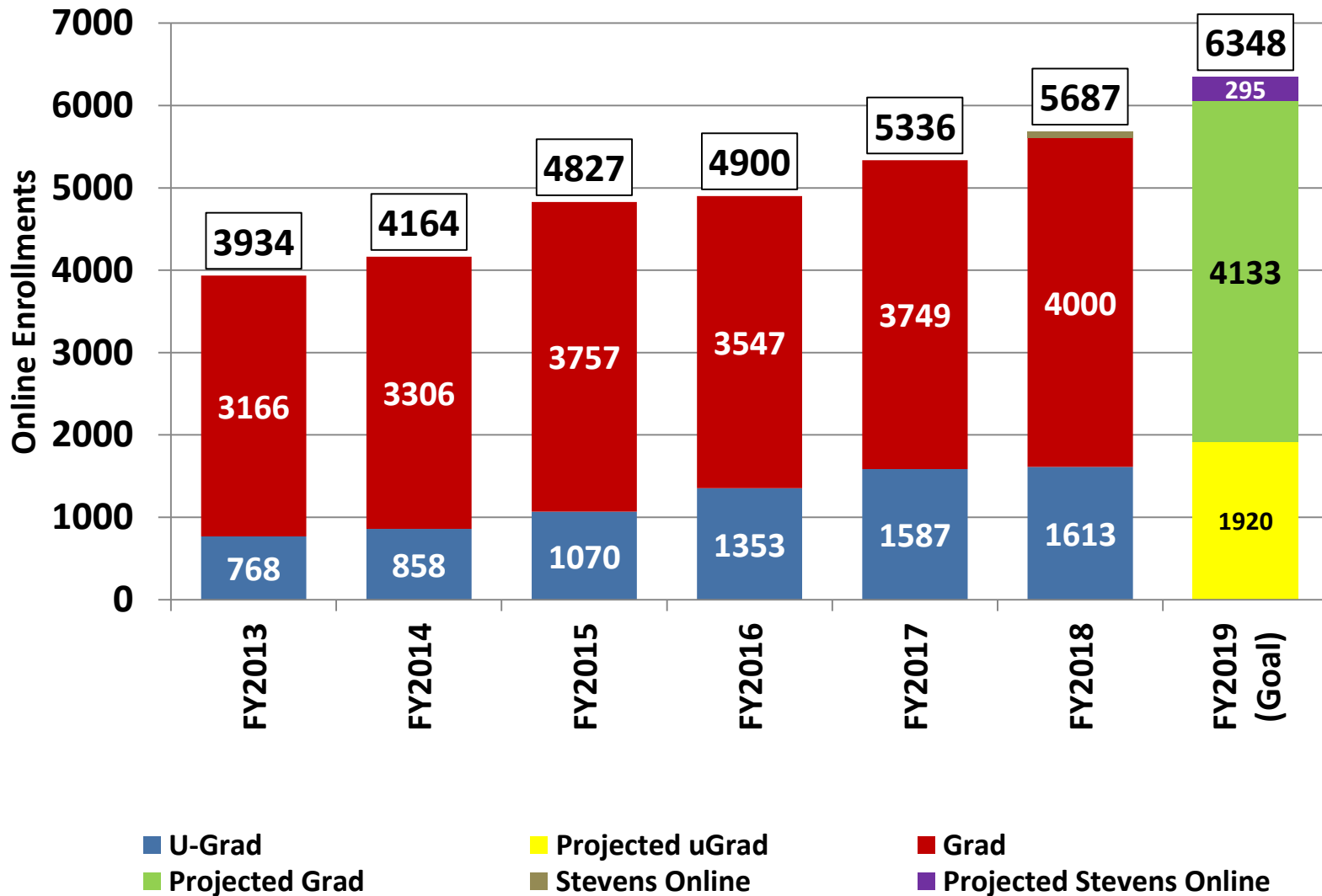
Enrollment Analysis - Local



Approximately 54% of all WebCampus graduate enrollments are for students who live over 45 minutes away from campus



Enrollments by Academic Year





Online Enrollments by Program

Pharmaceutical Manufacturing Graduate Program – Fall 2018

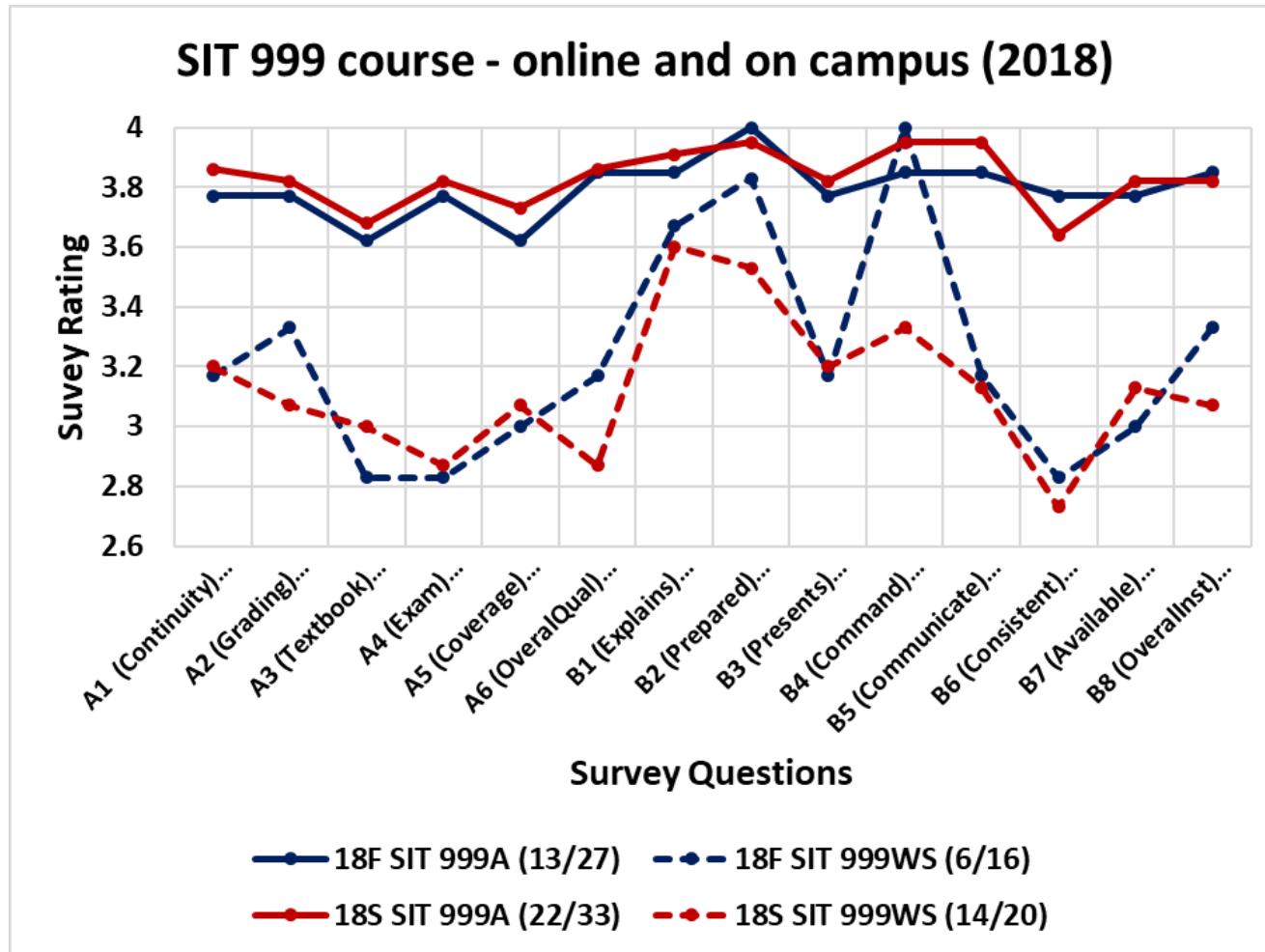
#	Section	Grad FT	Grad PT	Total Grad	U-Grad FT	U-Grad PT	Total U-Grad	Total Enrolled	Instructor
1	PME 530WS	5	1	6	19	0	19	25	Fitz
2	PME 531WS	3	3	6	16	0	16	22	Tortoriello
3	PME 540WS	6	7	13	10	0	10	23	Shnayder
4	PME 541WS	5	3	8	0	0	0	8	Pratt
5	PME 555WS	5	7	12	29	0	29	41	Zagmot
6	PME 580WS	3	2	5	5	0	5	10	Ting
7	PME 602WS	2	14	16	3	0	3	19	Shnayder
8	PME 626WS	11	4	15	7	0	7	22	Shnayder
9	PME647WS	3	3	6	3	0	3	9	Trieu
	TOTALS	43	44	87	92	0	92	179	

Assessments



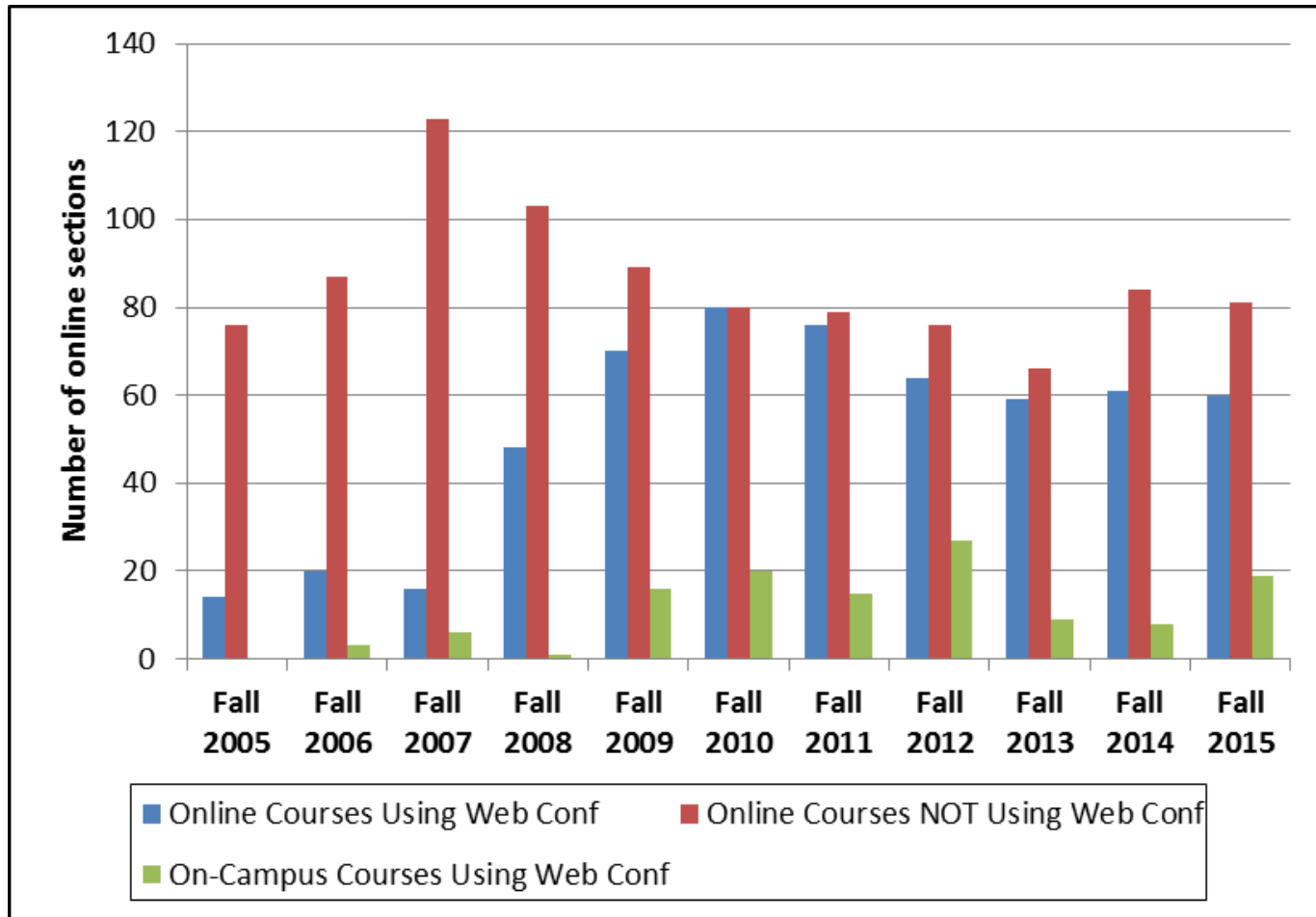
New approaches for old questions...

Comparing survey results for online & on-campus courses





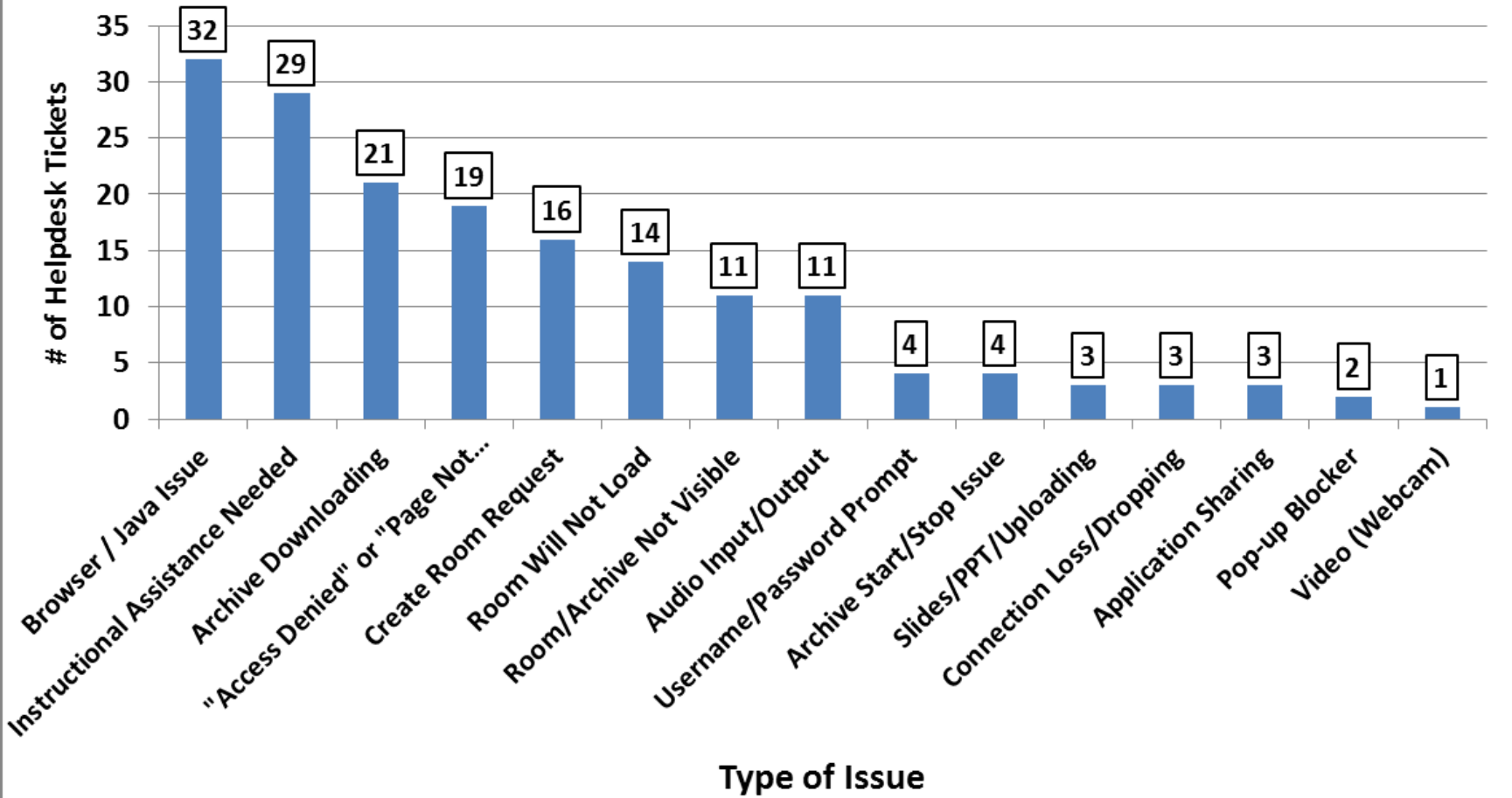
Use of Web Conferencing



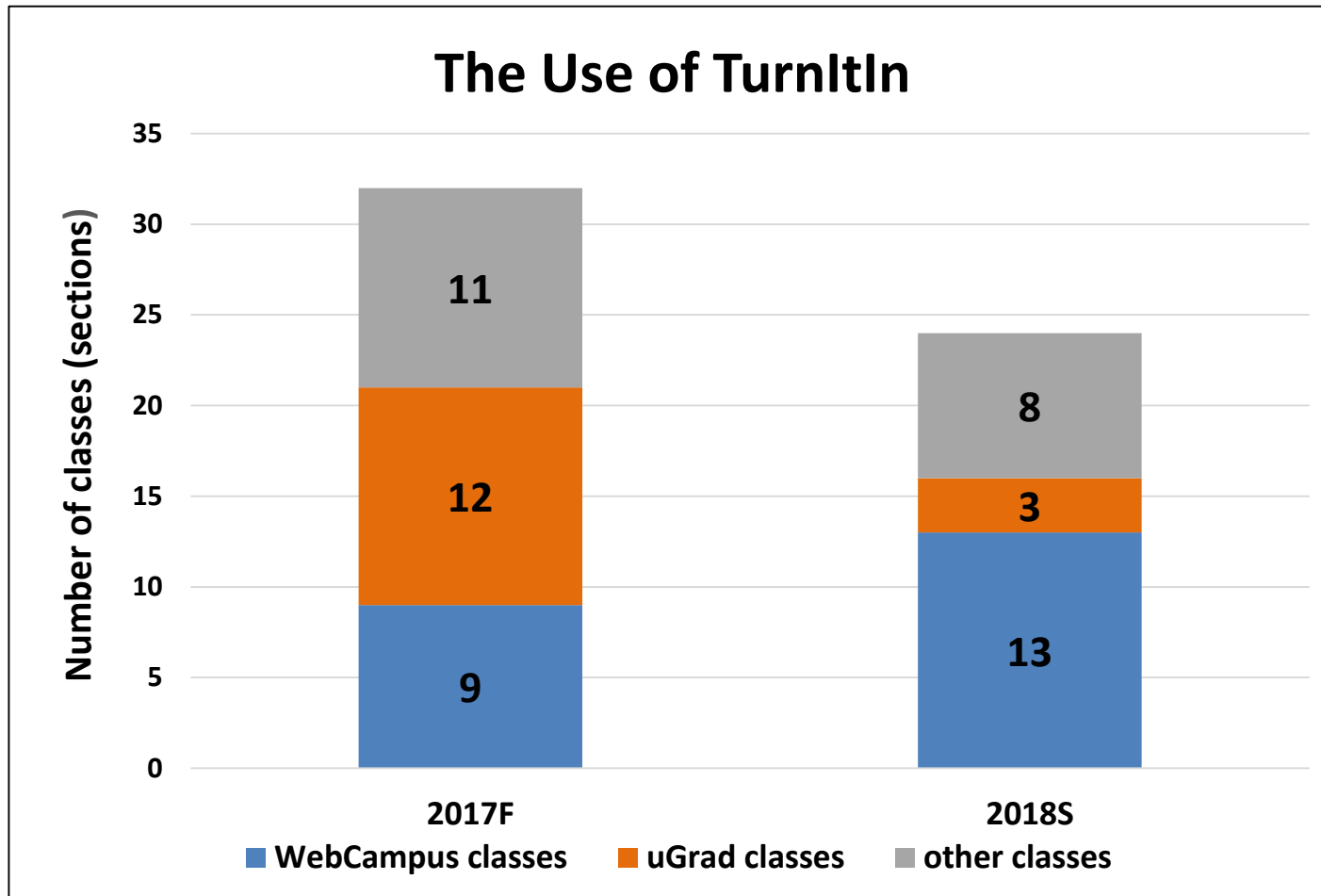


IT Problem Reports

Web Conferencing System Issues



Utilization Reports





Questions

Robert Zotti

rzotti@stevens.edu

Wendy Pate

wpate@stevens.edu