KENNEDY & COMPANY

USING DATA TO DRIVE SUMMER SESSION PLANNING (AND SUCCESS)

A PRESENTATION TO THE NORTH AMERICAN ASSOCIATION OF SUMMER SESSIONS

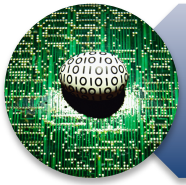
New Orleans, March 2017

Introduction to Kennedy & Company

Kennedy & Company is a DC-based boutique consulting firm focusing exclusively on the unique challenges and opportunities of higher education institutions. From improving enrollment, student success, and financial sustainability to shaping online education and academic portfolio strategies, we forge true partnerships with our clients to understand their institutions and co-create real solutions.

Improving Student Enrollment

Student Success



Improving the Academic Portfolio and Online Offerings

Financial Sustainability & Budgeting

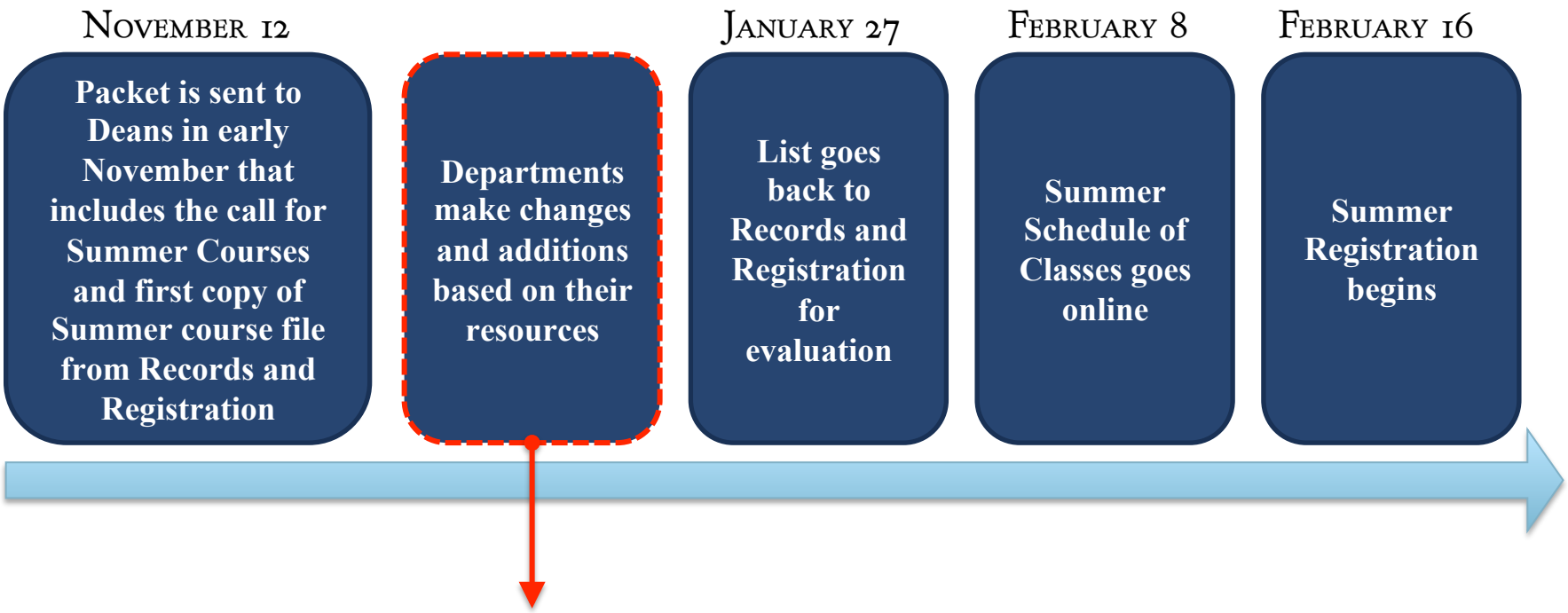
Our professionals have served numerous institutions of higher education, including:

- *Duke University*
- *Ohio State University*
- *Penn State University*
- *University of Utah*
- *Temple University*
- *University of Wisconsin-Madison*
- *University of Alabama-Birmingham*
- *Indiana University – Bloomington*
- *University of Colorado-Boulder*
- *University of Kansas*
- *Drexel University*
- *Louisiana State University*
- *Virginia Commonwealth University*
- *University of South Carolina*
- *Auburn University*
- *Thomas Jefferson University*
- *George Mason University*
- *Wayne State University*
- *University of Wyoming*
- *Villanova University*
- *Old Dominion University*
- *College of William & Mary*
- *Montgomery College*
- *Seton Hall University*
- *University of Arkansas – Little Rock*
- *University of Scranton*
- *Tennessee Tech University*
- *Tuskegee University*
- *Delaware County Community College*
- *Mott Community College*
- *The College of Saint Rose*
- *Pierce College*
- *University of Wisconsin System*
- *Moravian College*
- *Hood College*
- *Alvernia University*
- *University System of New Hampshire*
- *Lehigh Carbon Community College*
- *Reading Area Community College*
- *University of Mount Olive*
- *Lancaster Bible College*
- *University of South Carolina - Sumter*
- *University of Louisiana System*
- *Innovative Marketing Resources*
- *College Planning Institute*
- *Universities at Shady Grove*
- *Meritas Family of Schools*
- *Teach for America*

How Is the Summer Catalog Currently Created?

A Current Process for Ordering a Summer Course

The current system for creating a new summer course can be fairly ad-hoc and the process for deciding which courses will be offered is done differently between various deans and department chairs.



Despite having a critical role in this process, the deans and department chairs at many schools have little responsibility to be well-informed about course availability, demand, and impacts on student progression as they relate to summer courses.

Summer Course Catalog not Built Around Demand

This creates a scenario where the decisions on which courses to offer in the summer are made based on how available resources match up with course offerings.

Generally, this results in one of three methods for deciding on how to offer summer courses among the various academic departments on campus:

1. Status Quo

Departments plan to offer the same catalog of courses that were offered in previous years with little variance or research on past enrollment history or future demand.

2. Core Courses Only

Departments offer the most common and required core courses over the summer or those courses that the majority of students need to take in their curriculum at some point.

3. Faculty's Choice

Departments offer the courses that they have faculty willing to teach in the summer, regardless of whether or not they have any demonstrated interest among current students.

None of these methods for ordering up summer courses naturally produces the classes we need most in the summer to help with student progression.

Challenges to Staffing Summer Courses

One of the main reasons why Summer courses are not offered in a strategic way is that it is hard to find faculty that are willing and interested in teaching in the Summer.

Why don't faculty want to teach in the summer?

Tenure-track faculty that have not yet made tenure have a strong motivation to use their time over the summer to do research.

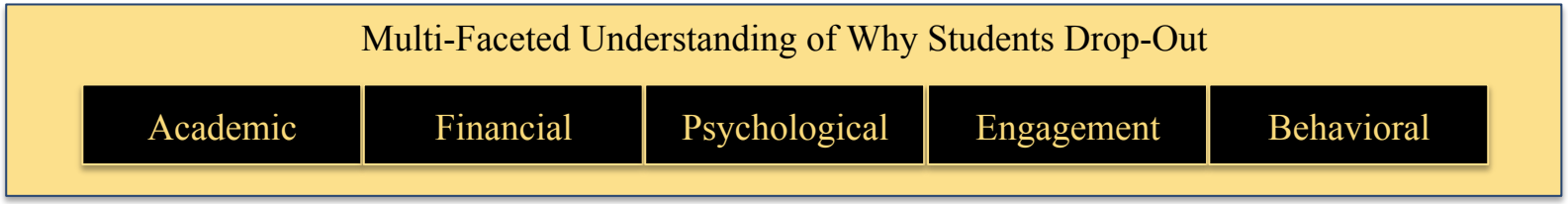
Compensation for summer faculty may not be competitive, especially for non-tenure adjuncts or instructors– see next page for detailed comparison.

Full-time, well-compensated faculty may not feel like it is worth giving up their summer to teach because of the low compensation incentive.

Why are Summer Offerings So Important for Student Success?

Summer Courses are Key to Promoting Student Progression

Summer offerings are one key solution to overcoming obstacles to student progression that might help the institution in its goals to increase overall student retention and graduation rates.



Possible Outcomes:

- Improved Advising/Coaching of Students
- Improved Financial Aid/ Scholarships where Needed
- Improved Student Experience/ Learning in Classrooms (esp. in most important classes)

Recommendations Specific to the Student Progression Study

- Implement a new tuition revenue-sharing mechanism for the summer that incentivizes the academic units to participate more fully in summer offerings. (Reduces Impeder Classes)
- Communicate findings on highly predictive DFW courses with academic advising resources across campus to help them identify and counsel students in these programs that might be at risk of dropping out or being impeded.

Summer Offerings can Help Students Overcome Course Bottlenecks

Based on our knowledge of course bottlenecks, we recommend that institutions work to create a better course ordering mechanism that promotes strategic decisions on what courses are needed during the school year and over the summer.

High DFW/ Repeated Courses

- These are courses that have a high incidence rate of students earning a "D," "F," or "W" in the course, requiring them to retake the course in order to receive credit toward their degree
- Many of these could be considered "weeder" classes for certain majors that have a high failure rate but are prerequisites for many other courses in the curriculum so students end up repeating them several times
- Most of the courses in this category are in the science curriculums/majors

Impeder Courses

- These are courses that slow down students progression because they are either only offered at limited times or they fill up quickly
- Many of these courses are then taken later than recommended in the students lifecycle, causing them to fall behind in their program curriculum
- These types of curricular challenges can impact full-load students that are on-track to graduation but have other drop-out risk factors

If Summer course offerings were determined based on this list, students would likely be better positioned to stay on track toward their degree and graduate on time.

Can Some DFWs Better Predict A Drop-Out?

VCU had 75 courses (out of 2,450) where receiving a D, F, or W became an above average predictor of dropping out of school.

Course	DFW Rate for Successful Students	DFW Rate for Eventual Drop-Outs	Predicted Drop-Out Rate, Given DFW	Number of Drop-Outs (Fall 2010 Cohort)
UNIV102	3%	30%	94%	65
ARTF134	3%	25%	75%	32
UNIV101	2%	10%	74%	80
UNIV111	5%	22%	72%	269
ARTF132	5%	32%	68%	47
AFAM103	4%	24%	67%	15
CHEM100	12%	37%	65%	105
ARTF133	3%	16%	64%	22
UNIV112	4%	15%	63%	205
MATH131	7%	24%	63%	111
CRJS181	3%	16%	62%	21
BIOZ101	7%	20%	59%	123
WMNS201	8%	39%	58%	50
ARTF131	4%	18%	58%	26
APPM370	4%	24%	57%	28
MGMT171	20%	59%	57%	128
PSYC101	14%	38%	57%	457
ECON101	14%	36%	56%	52
MATH141	14%	32%	55%	211
INTL103	20%	61%	55%	20
RELS108	7%	29%	54%	167
FRSC202	6%	29%	54%	41
CHEM110	10%	26%	53%	60
MASC101	13%	44%	53%	123
BIOZ151	8%	36%	52%	103
HUMS291	15%	46%	52%	21
HUMS202	4%	17%	52%	159
PHIL101	23%	32%	52%	25
CHEZ101	13%	40%	52%	242
WRLD203	10%	34%	52%	66
PHIL104	23%	42%	51%	35
ANTH103	13%	33%	50%	220
MATH151	24%	49%	50%	392
PHIL103	14%	37%	50%	20
UNIV291	8%	19%	50%	32

All other things being equal, a student that receives a D, F, or W has their likelihood to drop-out rise from 31.5% to 35.9%. Thus, classes where a DFW raises the predicted drop-out rate above 40% are significant.

Example: Decompressed Organic Chemistry in the Summer

One example of an alternative course design that universities may want to create an incentive for is to offer a class such as Organic Chemistry in a de-compressed (12-week) format that is more similar to what is offered during the fall and spring terms rather than the 3-8 week compressed summer courses.

WHY?

- *Organic Chemistry has a high DFW rate and is a prerequisite for many other courses in the curriculum.*
- *Many students taking Organic Chemistry over the summer are known to be repeaters, meaning they have already taken the course in the fall or spring semesters and have not passed*
- *Organic Chemistry is a course that could also appeal to non-VCU students that are home in Richmond for the summer*

BENEFITS

- *Offers students the opportunity to take the class on its own without an additional course load*
- *Relieves issues students face from the fast pace of a compressed summer course*
- *Could decrease the number of repeaters that crowd registration for this class during the fall and spring, inhibiting first-timers to get this class into their schedule.*

How do We Make the Summer Catalog More Strategic?

How to Change the Dynamics of Summer Planning

Current State

Departments offer courses based on what faculty are available and willing to teach in the summer.

Desired State

Departments offer courses in the summer based on what courses are most needed to promote student progression and retention.

Identifying a New Type of Demand for Summer Courses

Our approach focused ultimately on specific majors and how fast (or slow) some students were able to progress through a given curriculum.

1 Identify High DFW Courses

- DFW defined as courses where a student received a grade of "D", "F", or "Withdrew"

2 Identify Impeder Courses

- Identified as those pre-requisite courses taken by full-time, full-load students too late in their careers to ensure on-time graduation

3 Curriculum and Slow Progression Majors

- We reviewed those majors with the most students and the highest DFW and Impeder rates to narrow our list to the major most in need of improvement
- Curricular requirements from 2010-2011 VCU bulletin were used to create lists of core pre-requisites
- Cross-reference curriculums DFW and impeder lists to find likely bottleneck courses

4 Refine the List of Likely Bottleneck Courses

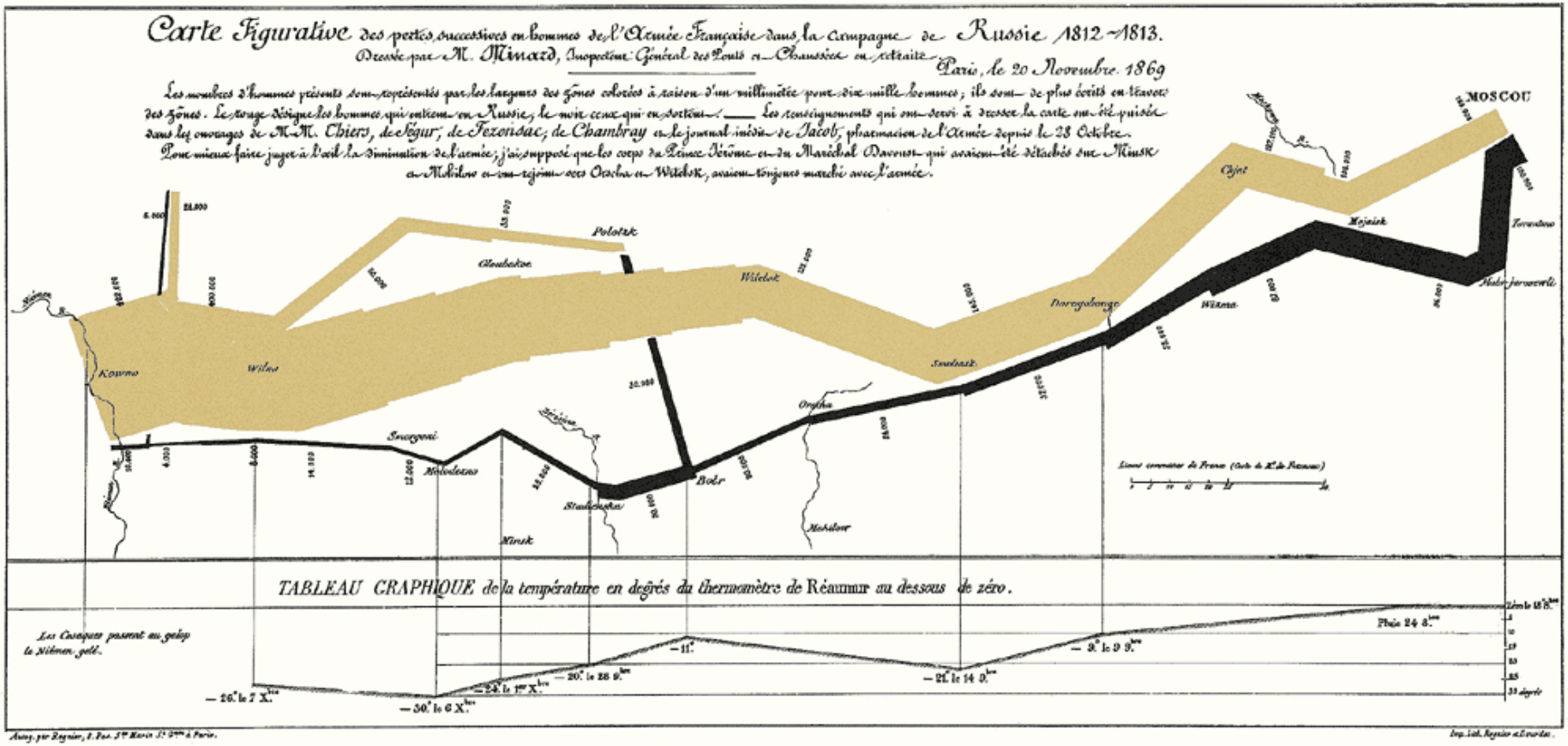
- Reviewed course availability, DFW rates by section, and summer/online availability to find courses where tough grading and/or availability may have created slow progression

Preliminary Course Build List

- By term
- By mode
- *Plus advising caveats*

Progression of the 2010 Fall Cohort

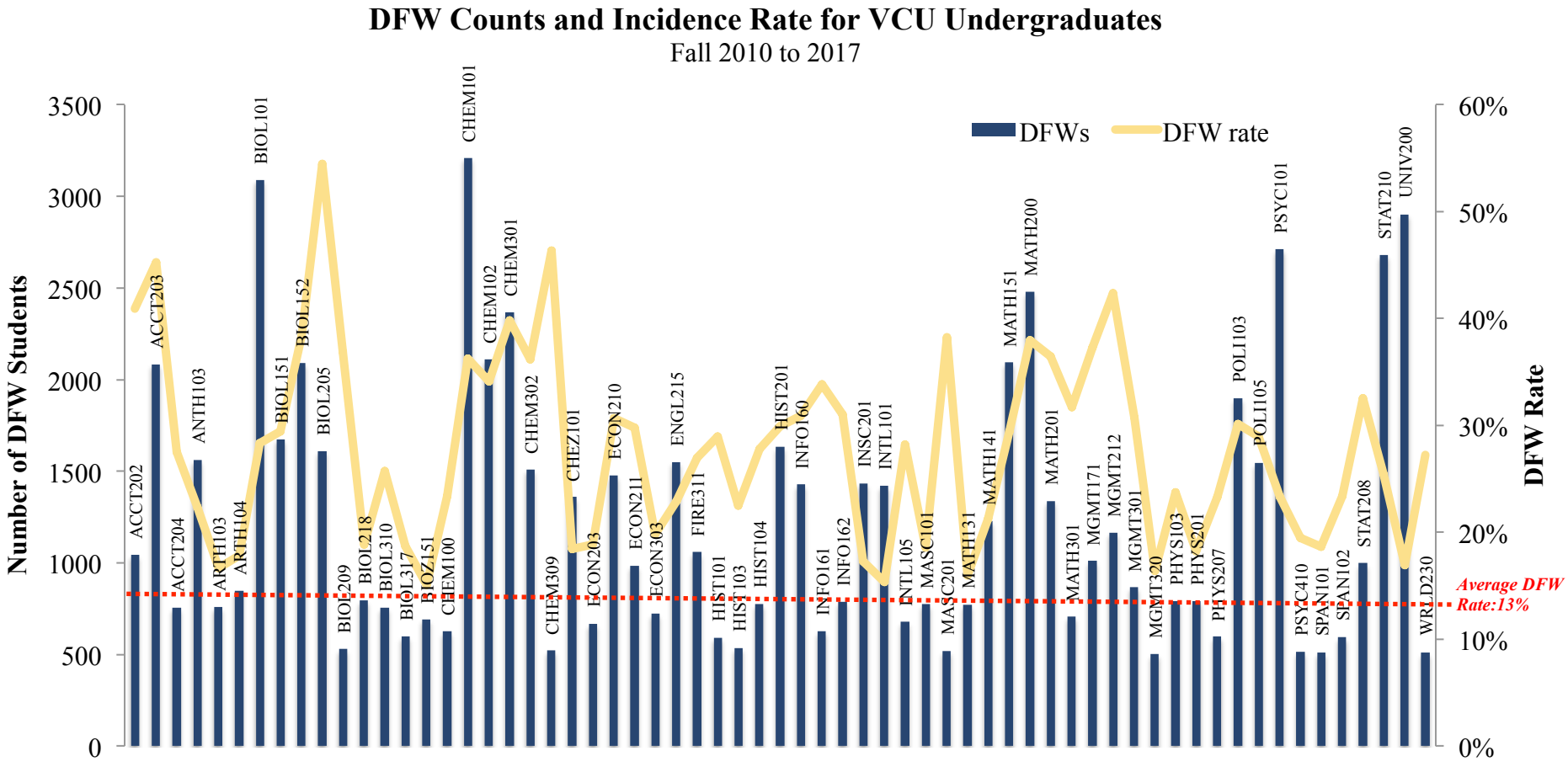
We focus on identifying courses that slow students down, rather than on pinpointing factors that cause early-stage drop-outs.



Fall 2010 | Spring 2011 | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 | Fall 2013 | Spring 2014 | Fall 2014 | Spring 2015

Big Picture: Science Pre-Reqs Dominate High DFW List

Of over 2,400 courses analyzed from Fall 2010 to Spring 2017, only 63 had DFW rates above 15% and combined DFW counts of 500 or more for the past 5 years.



We will explore how these classes impact specific progression through majors on the following pages.

Big Picture: Majors with the Most Drop-outs

Biology, psychology, mass communications, criminal justice, and liberal studies have the highest number of students that drop, excluding certain "pre-major" majors.

Tracking the Fall 2010 Cohort Progression

Last Major	Fall 2010	Spring 2011	Summer 2011	Fall 2011	Spring 2012	Summer 2012	Fall 2012	Spring 2013	Summer 2013	Fall 2013	Spring 2014	Summer 2014	Drop-out Total	Grad+ Enroll	Graduates	Drop-out Rate
Undeclared-Hum & Sciences*	31	56		25	28	1	13	7	1	10	8		180	16	NA	92%
Biology	18	37		15	17		6	11		3	8	3	118	198	138	37%
Business Foundation*	18	21	1	16	23	2	13	13		4	4		115	14	NA	89%
Pre-Nursing*	11	23		12	12	1	3	3		2			67	1	NA	99%
Psychology	8	10		7	9	2	5	4		4	7	1	57	186	136	23%
Art Foundation*	15	25	2	3	4		2	1		1			53	NA	NA	NA
Mass Communications	4	10		6	9		5	6	1	2	3		46	150	116	23%
Criminal Justice	5	3		8	8	1	5	2		2	4	1	39	108	75	27%
Lib Studies for Early&Elem Ed**	3	4		1	2		2	1		7	19		39	28	15	58%
English	4	7		5	2		1	4		4	4	2	33	64	46	34%
Hlth Phys Ed & Exercise Sci	3	5		3	8	1	1	4			1	1	27	81	42	25%
Forensic Science	5	2		4	4	1	2	2	1	3	1		25	44	23	36%
Fashion		3		2	2		1	1		3	9	3	24	64	59	27%
Mechanical Engineering	3	1	2	4	5	1	1	2		1	4		24	62	32	28%
Pre-Dental Hygiene*	4	5		3	4		2	2		2			22	1	NA	96%
Chemistry	2	4		3	6		2			2	2		21	52	33	29%
History	1	4		2	1		4	5		1		1	19	32	20	37%
Political Science		6			2		1	3			3		15	72	50	17%
Anthropology	1	2		1	3		2			2	2		13	18	13	42%
Computer Science	1	3		1	1		3			1	2		12	35	26	26%
Music	1	4		2	2					1	1		11	34	17	24%

**Pre-major major only; no graduates **The majority of these students appear to be transfers to a Master's degree program, impact seen in Spring 2014*

But Which Majors Appear to *Slow Down* Students?

To identify which courses and majors may slow down progress to a degree, we identified full-load (15+ credits/semester), full-time students that did not switch majors to see which courses they tend to take later than a "non-impeded" student.

VCU Majors with Greatest Number of Impeded Students
Fall 2010 Undergraduate First-Time Freshmen Cohort

Major	Impeded, Did not Switch Majors	Impeded, Switched Majors	Impeded, Grand Total
Biology	37	25	62
Psychology	12	34	46
Health Phys Ed & Exercise Sci	4	39	43
Mass Communications	6	23	29
Criminal Justice	10	14	24
Lib Studies for Early&Elem Ed	11	12	23
Business	0	22	22
Forensic Science	5	16	21
Chemistry	4	17	21
Mathematical Sciences	3	12	15
Political Science	1	14	15
English	6	7	13
Fashion	6	7	13
Accounting	0	12	12
Science	0	12	12
Music	10	1	11
Chem & Life Sci Engineering	5	6	11
Computer Science	3	8	11

This list provided a way to prioritize majors for further scrutiny. Majors with a lot of impeded students (as opposed to just many dropped students) will likely also have curricular impediments that rise above a high incidence rate of DFW classes.

Curricular challenges impacting full-load students likely frustrate students with other drop-out risk factors, part-time students, and those that drop out.

Summary: Bottleneck Courses for Prioritized Majors

The list below identifies the most likely bottlenecks for the largest and most impeded majors observed. The new predicted drop-out rate shows the new predicted rate at which students will drop-out, given a DFW in a given class.

Course ID	Name	5 YR DFW Rate	AVERAGE IMPEDED TIMING VARIANCE (IN YEARS)	INSTRUCTOR VARIANCE ○ = No Variance	AVAILABILITY ○ = No Summer/ Summer Online	Number of Times this Course was Taken over 5 YRS	Repeater Rate for the Course over 5 YRS	DFW Rate for NON-Drop-Outs*	DFW Rate for Eventual Drop-Outs*	Drop-Out Rate Risk, Given DFW*
Biology										
MATH151	Pre-Calculus	29%	0.19	◑	◑	7,116	12%	24%	49%	48%
BIOL151	Intro to Biological Science I	29%	0.54	◔	◑	5,695	12%	13%	32%	43%
BIOL152	Intro to Biological Science II	38%	0.82	◔	●	5,450	19%	30%	48%	27%
CHEM101	General Chemistry I	36%	0.28	◕	◑	8,860	17%	22%	42%	40%
CHEM102	General Chemistry II	34%	0.75	◑	◑	6,188	19%	24%	50%	31%
CHEM301	Organic Chemistry I	40%	1.32	◔	◑	5,949	27%	36%	74%	15%
CHEM302	Organic Chemistry II	36%	0.81	◔	◑	4,174	23%	30%	50%	4%
Criminal Justice										
CRJS380	Research Methods in Criminal Justice	19%	1.14	◕	○	1,276	5%	4%	NA	NA
Mass Communication										
STAT208	Statistical Thinking	33%	0.86	◔	◑	3,069	12%	13%	32%	47%
HIST104	Survey of American History II	28%	0.07	◑	◑	2,791	8%	14%	25%	22%
MASC201	Curiousness	38%	-0.39	●	◑	1,359	11%	13%	56%	**56%**
Music										
MHIS120	Introduction to World Musical Styles	22%	0.40	◑	○	320	9%	19%	80%	**50%**
MHIS145	Theory and Aural Skills I	22%	-0.13	◕	○	352	3%	11%	50%	**69%**
MHIS146	Theory and Aural Skills II	22%	-0.32	●	○	300	5%	13%	50%	**50%**
MHIS246	Theory and Aural Skills IV	27%	0.59	◕	○	232	4%	15%	75%	38%
Psychology										
BIOL101	Biological Concepts	28%	1.11	◔	◑	10,890	10%	25%	51%	**51%**
BIOL103	Environmental Science	21%	2.52	◕	◑	1,637	3%	21%	50%	31%
PSYC101	Introduction to Psychology	23%	1.19	◕	●	11,630	8%	13%	37%	**62%**
STAT210	Basic Practice of Statistics	25%	1.49	◑	◑	10,533	12%	0%	50%	45%
Health, Physical Education and Exercise Sciences										
BIOL205	Basic Human Anatomy	54%	0.87	○	◑	2,957	23%	52%	89%	33%
MATH131	Intro to Contemporary Mathematics	16%	-1.00	◕	●	4,831	12%	0%	25%	**100%**

**UNIV111 and UNIV112 have been removed from this list after further analysis of the LSEE program*

**Based on Fall 2010 Cohort Data*

Qualitative Factors Contribute to the Impeder Story

BIOLOGY

- Core curriculum consists of several classes with high DFW rates
- Most foundation level courses are accompanied by a laboratory course
- Curriculum is highly sequential

PSYCH

- "Weeder" courses early in the curriculum have the potential to put students off-track
- Timing of core courses taken is highly correlated to student progression
- Only 2 of the core courses are offered over the summer

CRIMINAL JUSTICE

- DFW rates for courses in-major are higher than the average at VCU
- Impeded students, on average, in their 4th year at VCU

HEALTH SCIENCE

- BIOL 205 is a prerequisite for this major and it has a DFW rate of over 50%
- Very few courses are offered online over the summer

MASS COMM

- Low DFW rates in most of the core curriculum with the exception of 2-3 courses
- STAT 208 instructors may be contributing to this bottleneck
- High potential to expand more of the core courses to the summer and online

LIBERAL STUDIES

- LSEE was originally seen as an issue but under further analysis, drop-out rates were found to be misleading due to the way students are coded when crossing into the graduate program
- No longer considered a program to focus on

MUSIC

- Fewer students in major
- High DFW rates among core courses
- Several courses offered in only one term, sequencing very important
- Difficult for students transferring in from another institution or major

Using Summer to Promote Student Progression

With the implementation of an incentive program for summer course offerings, VCU created more flexibility in designing its summer catalog in a way that really supports retention efforts.

Most of the course identified as "impeders" are difficult math & science courses that are also pre-requisites for many upper-level courses:

Course ID	Name	PRIORITY	WHY?
MATH151	Pre-Calculus	HIGH	*At least 50% of students at VCU take this course and it is a pre-requisite for several programs*
CHEM101	General Chemistry I	HIGH	*This course impacts a large number of students and is a pre-requisite for the second level course that is required. Both also have accompanying labs*
CHEM301	Organic Chemistry I	HIGH	*This course impacts a large number of students and is a pre-requisite for the second level course that is required. Both also have accompanying labs*
STAT208	Statistical Thinking	HIGH	*Instructor variance is likely casual to student DFWs in this course*
BIOL101	Biological Concepts	HIGH	*At least 50% of students at VCU take this course and it is a pre-requisite for several programs*
PSYC101	Introduction to Psychology	HIGH	*Approximately 60% of students take this course at VCU and it creates a bottleneck for some students who take it late.*
BIOL205	Basic Human Anatomy	HIGH	*Instructor variance is likely causal to student DFWs in this course which create a significant bottleneck in some programs*

Also many students taking courses over the summer are repeater students. By offering these courses over the summer, it would give students the opportunity to:

- Repeat the course outside the regular school year so as not to get behind
- Focus on one [difficult] class outside of the regular semester terms

VCU may also want to consider varying the formats of courses and course design over the summer to further promote student's success in these courses.

So We Just Snap Our Fingers And…

Two Primary Barriers to Summer Course Creation

Understanding Demand

Departments offer courses in the summer based on what courses are most needed to promote student progression and retention.

Generating Supply

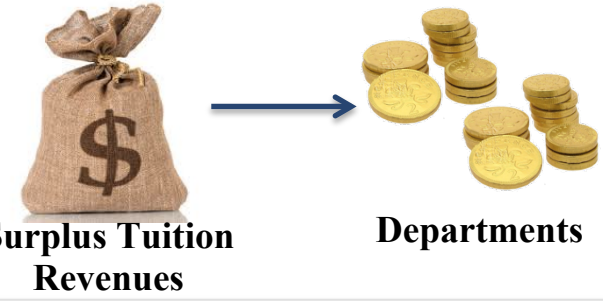
The University gets the right instructors and the right classes to meet the demand

Offering an Incentive in the Annual Budget

Based on our discussions, it appears a monetary incentive is needed. But how to offer it?

Offer a Flat, Per-Course Incentive for Courses VCU Most Needs

- ✓ Small amount of extra dollars for faculty
- ✓ Specific incentive grants for departments
- ✓ Need to measure investment dollars required.
- ✓ What is the elasticity of the effect? How much will it take to get departments to offer just the right classes?

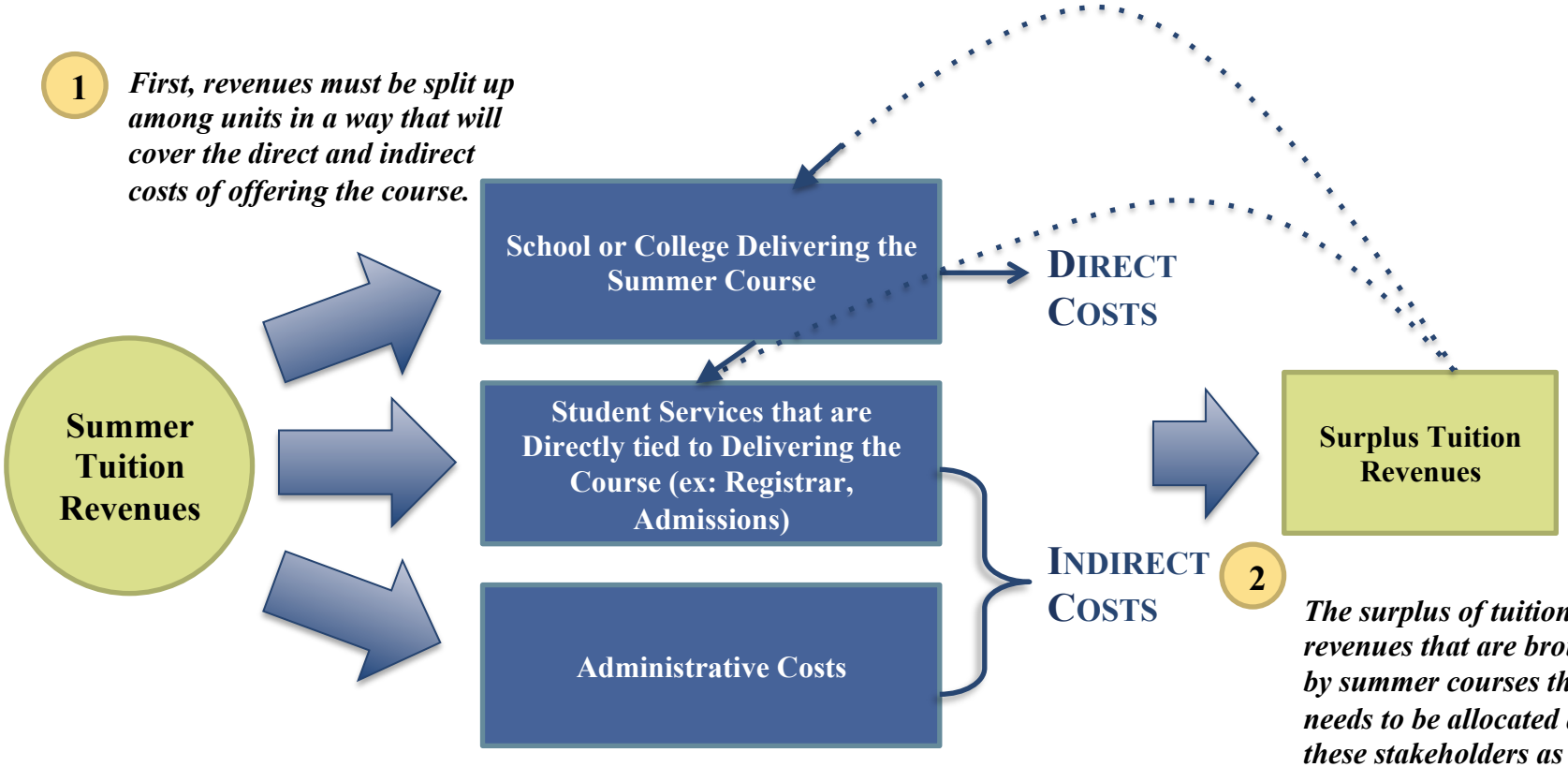


Offer a Revenue-Sharing Incentive to Departments

- ✓ Pre-cursor to RCM budget model (possibly)
- ✓ Transfers all incentives to departments, assuming departments are properly informed of right courses to offer
- ✓ Need to measure investment dollars required versus VCU's central need for summer revenue dollars? Would additional summer revenue dollars be generated as a result?
- ✓ What is the elasticity of the effect? How much will it take to get departments to be serious?

Implementing a Revenue-Sharing Model

An effective revenue-sharing model should map out how to cover costs and allocate summer tuition revenues that are generated by the university's catalog of summer courses.



Offering a Financial Incentive Tied to Courses

An even better solution to this problem might be to offer incentives that are tied directly to the course offerings and faculty members themselves.

- ***By offering incentives directly tied to course offerings, the University has more control over the courses offered and the incentive is more impactful to both the department and/or the faculty member.***

- The University should increase faculty summer compensation to at least be competitive with that offered at any other local Colleges.

- The University can have more control over what is offered.
- The University can offer differential incentives based on those courses that are in greatest need but might have the least appeal to summer instructors.
- The money will go directly to the instructor and/or the department-level budget and therefore may be more meaningful, even in small amounts.

Linking Incentive Pay to Course Needs

Identifying the most critical courses (from a student progression perspective) can help limit the additional costs needed to get the "right" supply of summer courses.

Bottleneck Courses Desired for Summer Offering (VCU Sample)

Course Number	Course Title	Summer Sections Offered	Open Seats	Additional Summer Sections Desired	Cost of Incentive Program
MATH151	Pre-Calculus	5	43	0	$0
CHEM101	General Chemistry I	5	20	0	$0
CHEM301	Organic Chemistry I	2	21	0	$0
STAT208	Statistical Thinking	0	-	4	$16,000 to $20,000
BIOL101	Biological Concepts	0	-	4	$16,000 to $20,000
PSYC101	Introduction to Psychology	4	50	0	$0
BIOL205	Basic Human Anatomy	0	-	4	$16,000 to $20,000

Source: VCU 2017 Summer Course Offerings

Other Summer Considerations

Other Considerations to Make Strategic Summer Scheduling a Success

- Make summer scheduling a strategic partner in the retention and graduation rate efforts
- Enhance summer scheduling method based on bottleneck class findings
- Expand the base of students with alternative modalities
- Provide alternative funds to develop retention-enhancing summer course modules (e.g., summer-long organic chemistry versus 6-8 week condensed course)
- Develop a reporting methodology to inform next set of summer incentive courses each year.
- Incentive course-selection process should be a mix of "art and science" to prevent creation of an adverse incentive for schools to offer bottleneck courses (at the extreme)
- Marketing new course availability should be en masse and targeted
- Combine with other incentives to take summer courses (tuition discounting, housing stipends)

Questions?

- Copy of this presentation available at www.kennedyandcompany.com/insights or by e-mailing Ben at bkennedy@kennedyandcompanycom

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