

Minding the Grades

Lessons Learned From Building a Class Performance Dashboard

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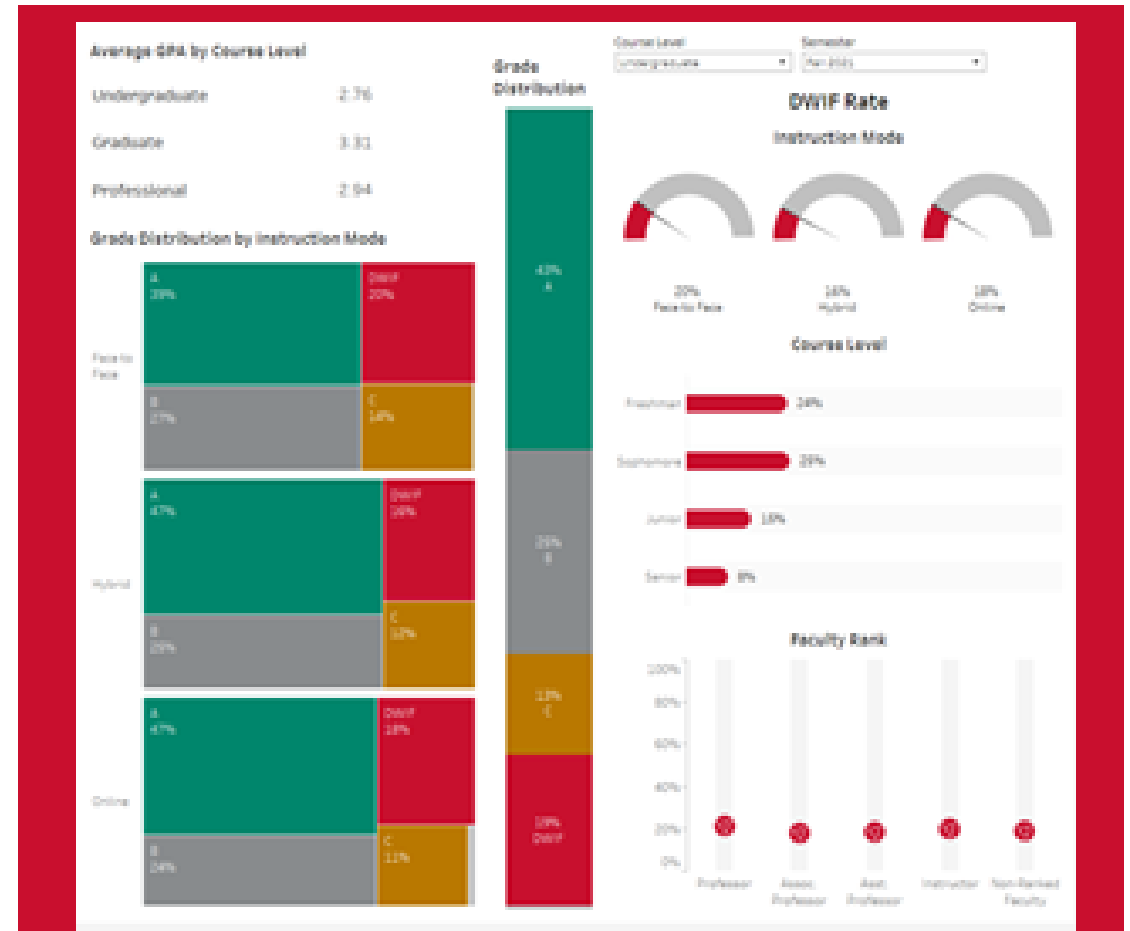
Background

- University of Houston
 - Founded in 1927
 - Flagship of the University of Houston System
 - Public, Tier One research university
 - 277 undergraduate, graduate and professional programs
 - Fall 2022 enrollment: 46,700



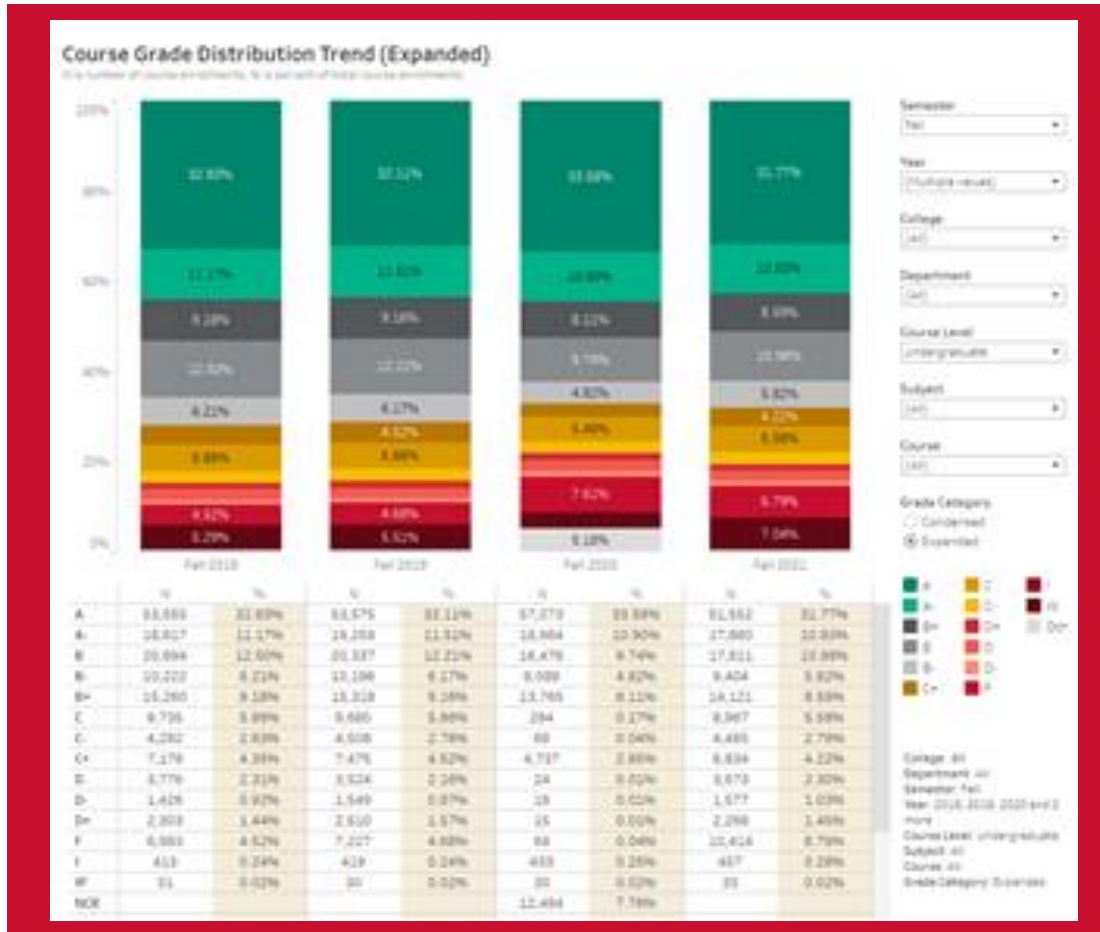
Background

- Creation of a Data Warehouse (DW)
- DW has PeopleSoft data:
 - enrollment data from Summer 2000 onward
 - admissions data from Fall 2010 onward
 - CB data from Fall 2007 onward
- A result of collaboration between the data warehouse team and the IR Office.



Stage 1: What did we want to show?

- Looked to other universities for ideas and inspiration.
- Reviewed previous ad hoc data requests.
- Contacted other institutions.
- Narrowed down to DWIF rate and grade distribution.



1 *Learn from others!*

Examples we found:

Grade Distribution Percentages by Subject and Instructional Method

Proportions of grades earned in all courses within a subject split out by instructional method during the selected academic period. Courses using the A-F grading system only. Directed studies excluded.

Division

- Career & Tech Ed & Business
- Health Professions
- Liberal Studies
- STEM & Education

Academic Period

Fall 2020

Final Grade

- A
- B
- C
- D
- F
- AU
- IP
- W



Grade Distribution Percentages By Course Over Time

The proportions of grades earned over the last five academic periods in the selected season. Optionally filtered by subject or course. Courses using the A-F grading system only. Directed Studies excluded.

Season

- FALL
- SPRING
- SUMMER

Subject

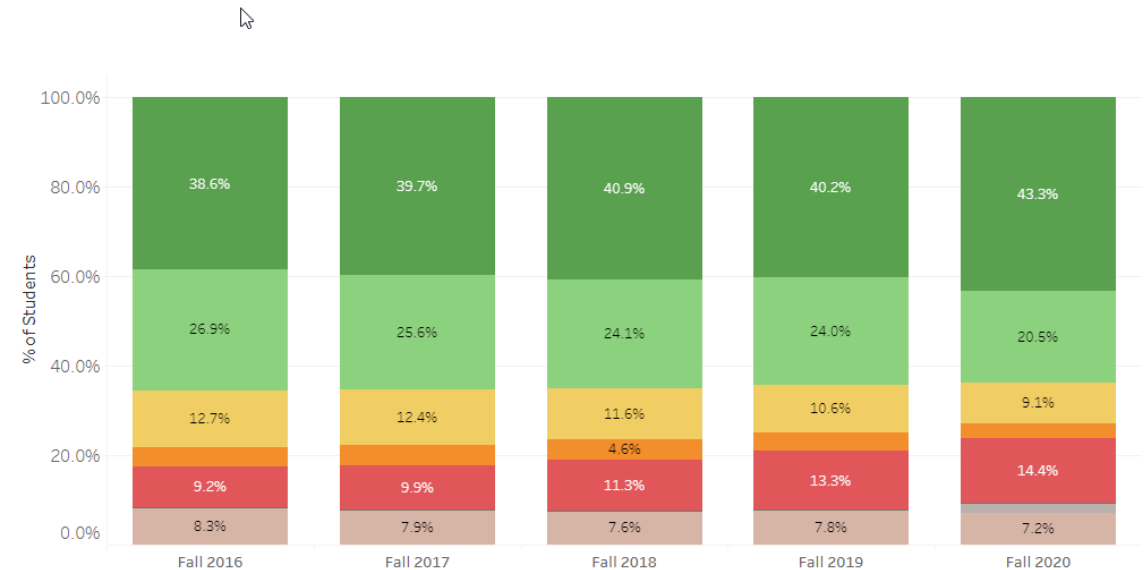
(All)

Course ID

(All)

Final Grade

- A
- B
- C
- D
- F
- AU
- IP
- W



Examples we found:

Grade Distributions

Bar Graph View Crosstab View Show Instructions ?

Select year and semester: Filter by:

Academic year: Course Prefix: Course Number: Select grade level of detail:

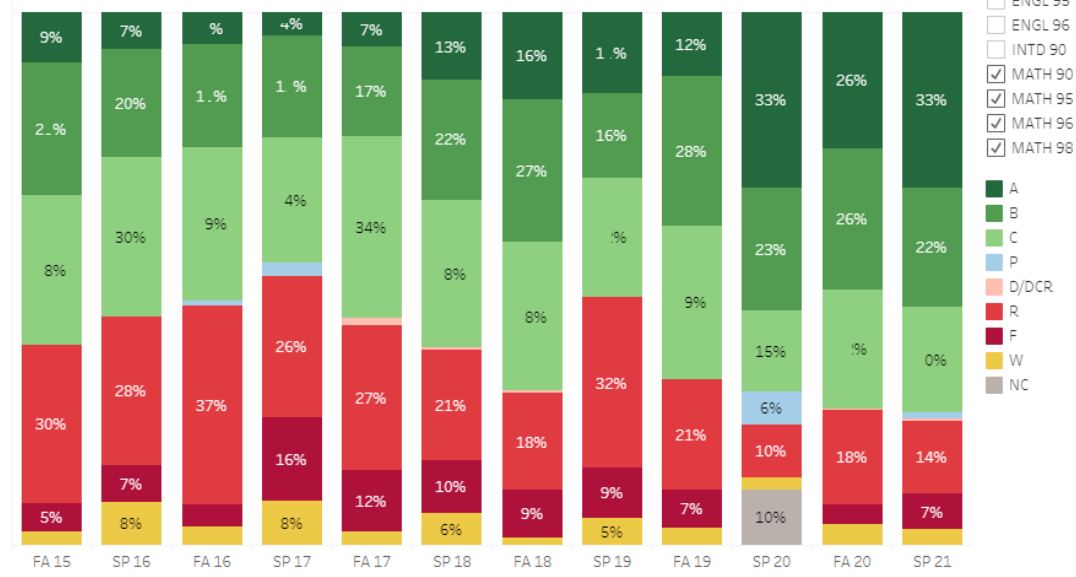
Semester: Section number: Course Title:

Semester	Department/Program	Course	Letter Grade	Count
Summer 2022	Architecture	ARC-F380D: TWENTY SECND CENT MATERIALS-WB, Section no. 70454	A	10
			B	1
			Other	2
Architecture	ARC-S311L: VISUAL COMMUNICATION II, Section no. 70530	A	6	
		B	5	
		C	2	
Architecture	ARC-S381D: ARCHITECTURAL DRAWING, Section no. 70545	A	15	
		B	2	
		Other	1	
Architecture	ARC-S386M: INTRODUCTORY STUDIO, Section no. 70555	A	15	
		B	2	
Business Administration	B A-F280N: OPERATIONS MANAGEMENT-I-HOU, Section no. 70775	A	15	
		B	11	
Business Administration	B A-F280N: OPERATIONS MANAGEMENT-II-HOU, Section no. 70780	A	13	
		B	13	
Business Administration	B A-N280N: OPERATIONS MANAGEMENT-I-DAL, Section no. 70785	A	18	
		B	17	
Business Administration	B A-N280N: OPERATIONS MANAGEMENT-II-DAL, Section no. 70790	A	18	
		B	17	
Business Administration	B A-F180P: PROJECT MANAGEMENT-TEMBA, Section no. 70815	A	67	
		B	1	
		Other	2	
Business Administration	B A-N184S: 2-MANAGERIAL MACROECON-I-DAL, Section no. 70820	A	15	
		B	20	
Business Administration	B A-N184S: 2-MANAGERIAL MACROECON-I-HOU, Section no. 70825	A	10	
		B	16	
Business Administration	B A-N184S: 2-MANAGERIAL MACROECON-II-DAL, Section no. 70830	A	21	
		B	14	
Business Administration	B A-N184S: 2-MANAGERIAL MACROECON-II-HOU, Section no. 70835	A	15	
		B	11	
Business Administration	B A-N184S: 2-MANAGERIAL MACROECON-TEMBA, Section no. 70840	A	35	



Grade Distributions, Developmental Cc

Courses Displayed: MATH 90, MATH 95, MATH 96 and 1 more

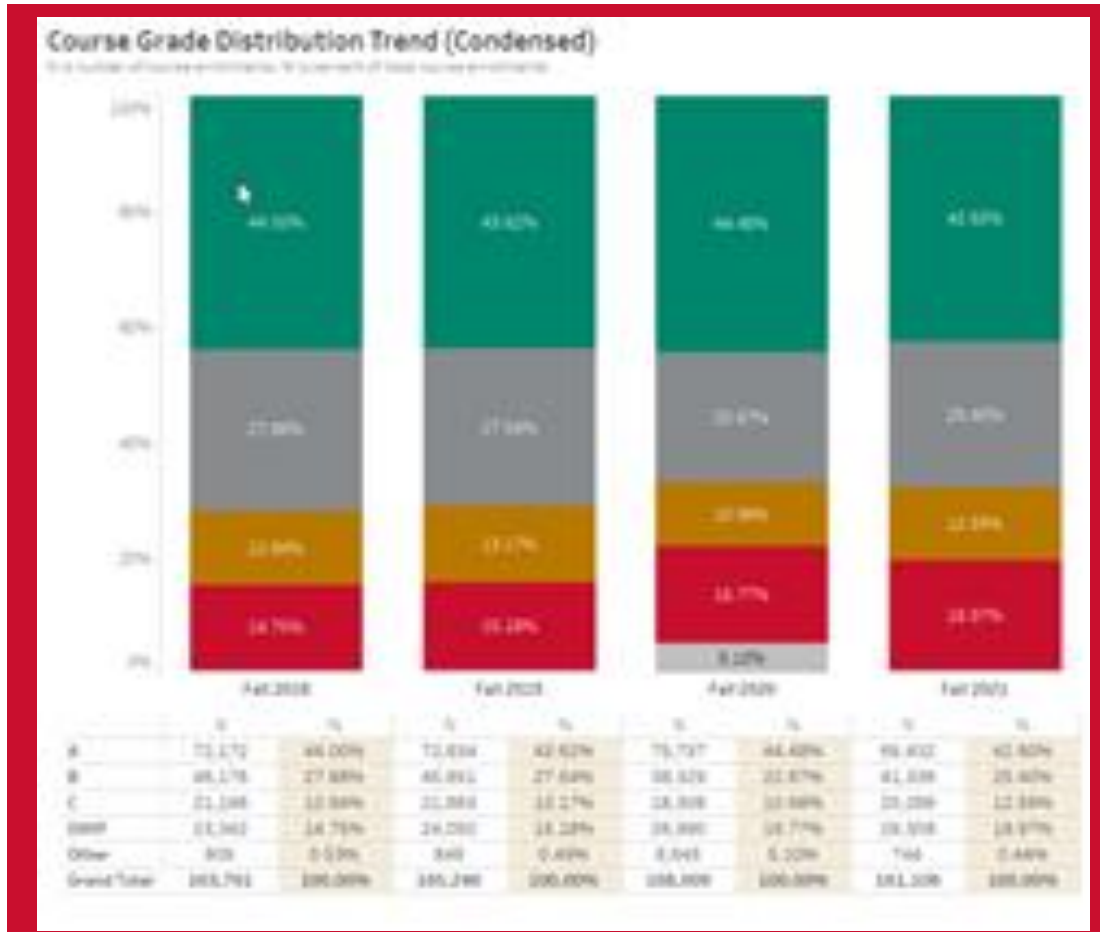


Course Enrollment

	FA 15	SP 16	FA 16	SP 17	FA 17	SP 18	FA 18	SP 19	FA 19	SP 20	FA 20	SP 21
MATH 90		92	349	119	385	156	404	113	337	55	305	82
MATH 95	330											
MATH 96			172	136	130	119	130	150	175	122	152	112
MATH 98	393	305	75	59	89	29	57	14	73	14	54	12
All	721	397	596	314	612	304	671	277	585	191	511	206

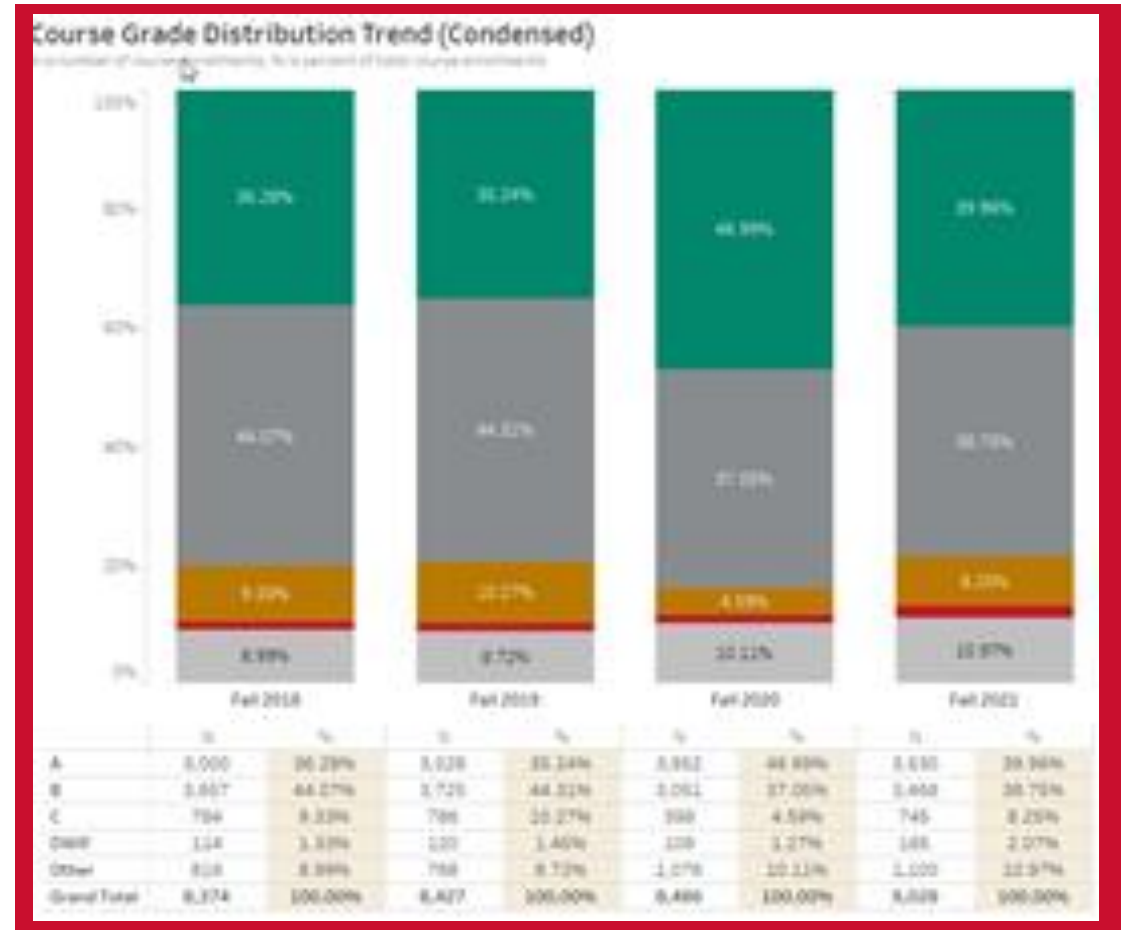
Stage 2: What was available in our data?

- Took us a while to understand the data.
- Some examples of the challenges:
 - Class attribute table
 - Snapshots not in sync.
 - Learn about rarely used class attributes



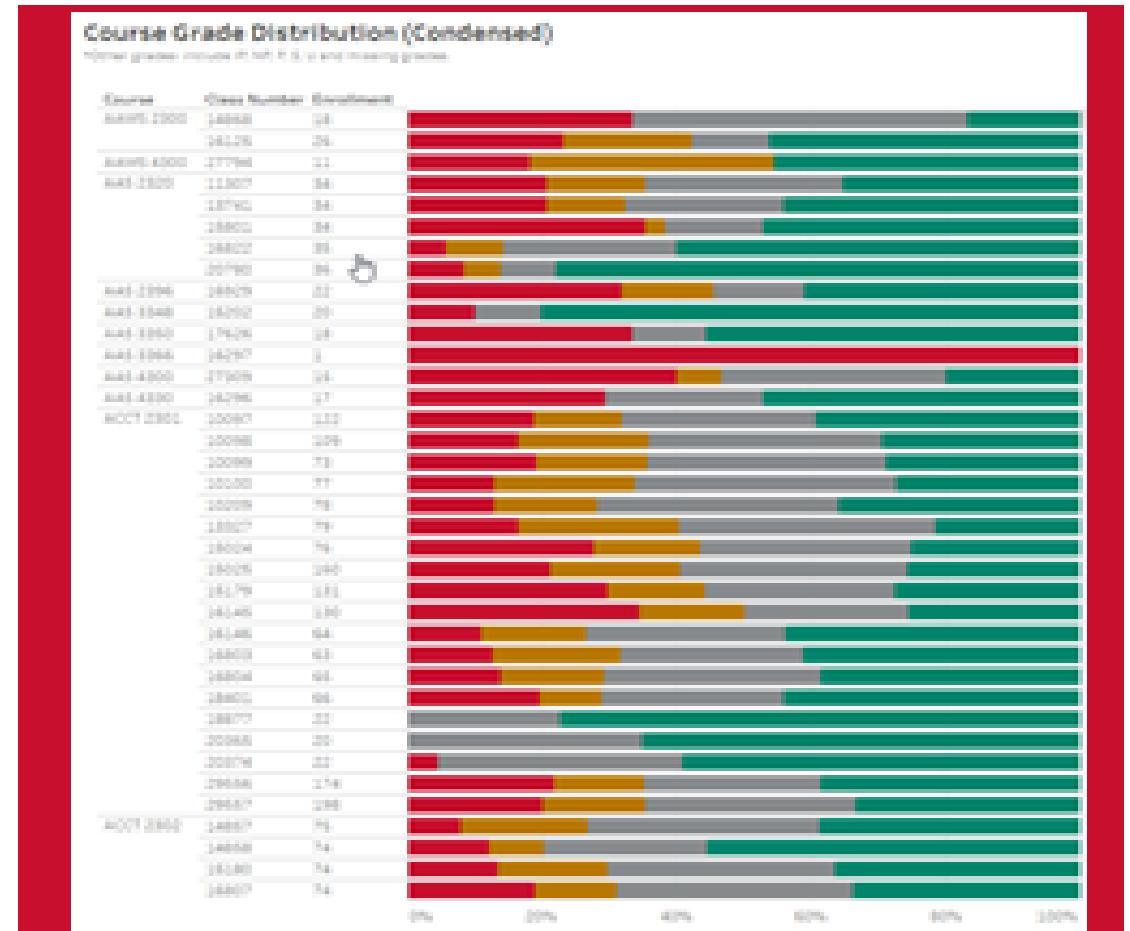
Stage 2: What was available in our data?

- More Challenges:
 - Grading policy changes due to COVID.
 - Courses with both lecture and lab component: grades and credits go to lecture.
 - Courses with “non billable hours” as the course credit level.
 - Courses missing college, department, or instructor information



Stage 2: What was available in our data?

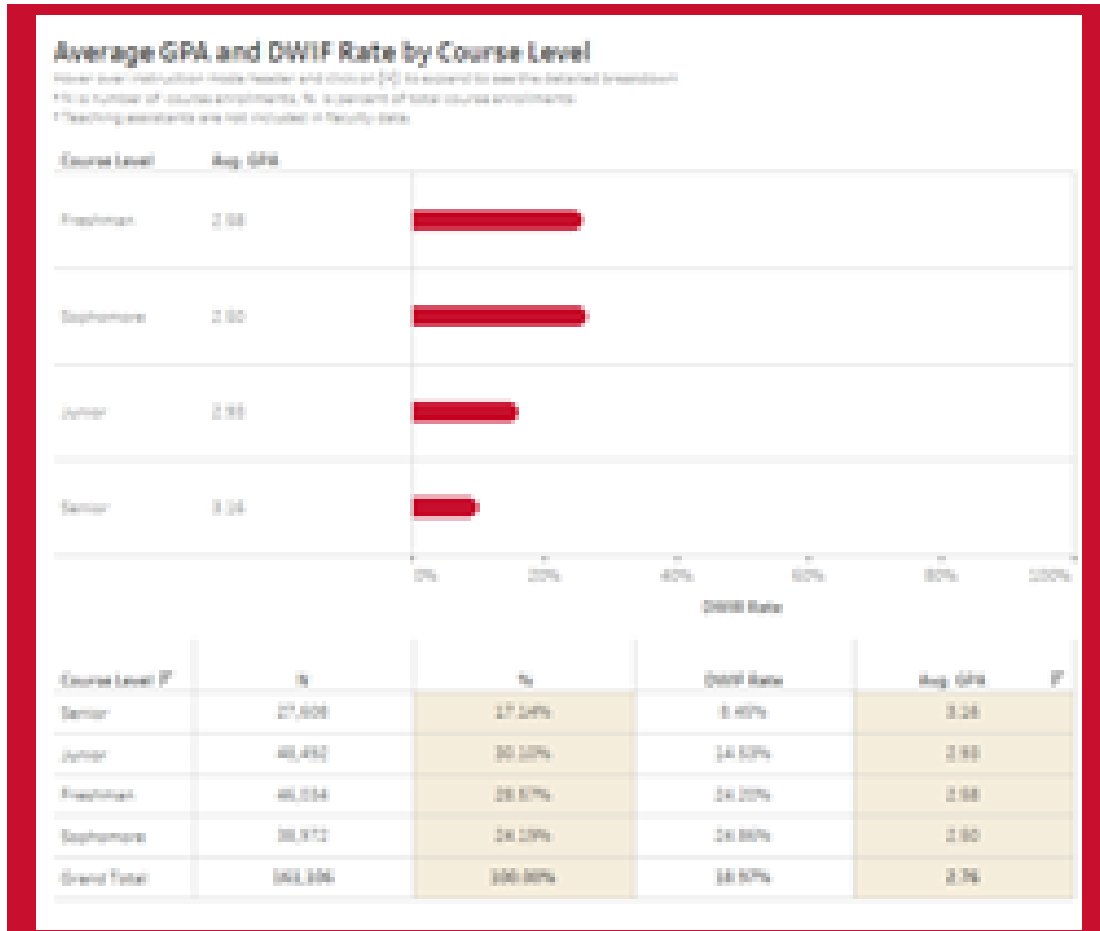
- More Challenges:
 - Numbers from the DW vs. CB reports
 - Old courses with nonstandard grades
 - Courses with multiple associated faculty



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Make it a team effort!

Stage 2: What was available in our data?



- Like making human friends, we
 - Read everything about it.
 - Asked people familiar with it to share what they know.
 - Were suspicious when it looked too perfect to be true.
 - Understood that knowing it could take some time.

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Make friends with your data!

Stage 3: How did we wrangle the data into what we needed?

- Our Flow
 - Data preparation done in SAS
 - The logic then shared with the data warehouse team.
 - Tableau extract created in a test environment.
 - Errors/issues ironed out iteratively
 - Tableau extract created in the production environment

Course DWIF Rate Trend
FN is number of course enrollments.

Course	Fall 2018	Fall 2019	Fall 2020
5 2300	7.7%	12.5%	10.3%
5 4300	0.0%	0.0%	
5 4307			0.0%
2320	12.0%	14.8%	8.0%
2396	17.6%	9.1%	0.0%
3307			0.0%
3310	26.3%	52.9%	
3330		31.6%	15.8%
3348	0.0%	14.8%	20.0%
3360		14.3%	0.0%
3364		17.4%	
3366	0.0%	100.0%	25.0%
3394	14.9%	26.7%	0.0%
4300			
4330	20.6%	24.2%	6.7%
4377			50.0%
2301	17.6%	19.2%	4.0%
2302	14.4%	18.2%	2.3%
3366	49.2%	51.8%	24.9%

Average Course GPA by Semester

Course	Spring 2020	Spring 2021	Fall 2020	Fall 2021
COMM 4398	3.54	3.87	3.40	3.86
COMM 4399		4.00		
COMM 6300	3.20	3.63		
COMM 6305			3.96	3.46
COMM 6310			3.69	3.72
COMM 6326			3.74	
COMM 6335				3.87
COMM 6336		3.62		
COMM 6338	3.33			
COMM 6345			3.55	
COMM 6350		3.61		
COMM 6363		3.07		
COMM 6370			3.90	3.37

Stage 3: How did we wrangle the data into what we needed?

- Issues to Address:
 - Nulls in different data fields
 - College and department aliases (updating alias tables)
 - Subject and catalog number changes due to TCCNS
 - Add or replace data fields (e.g., off_campus not differentiating)

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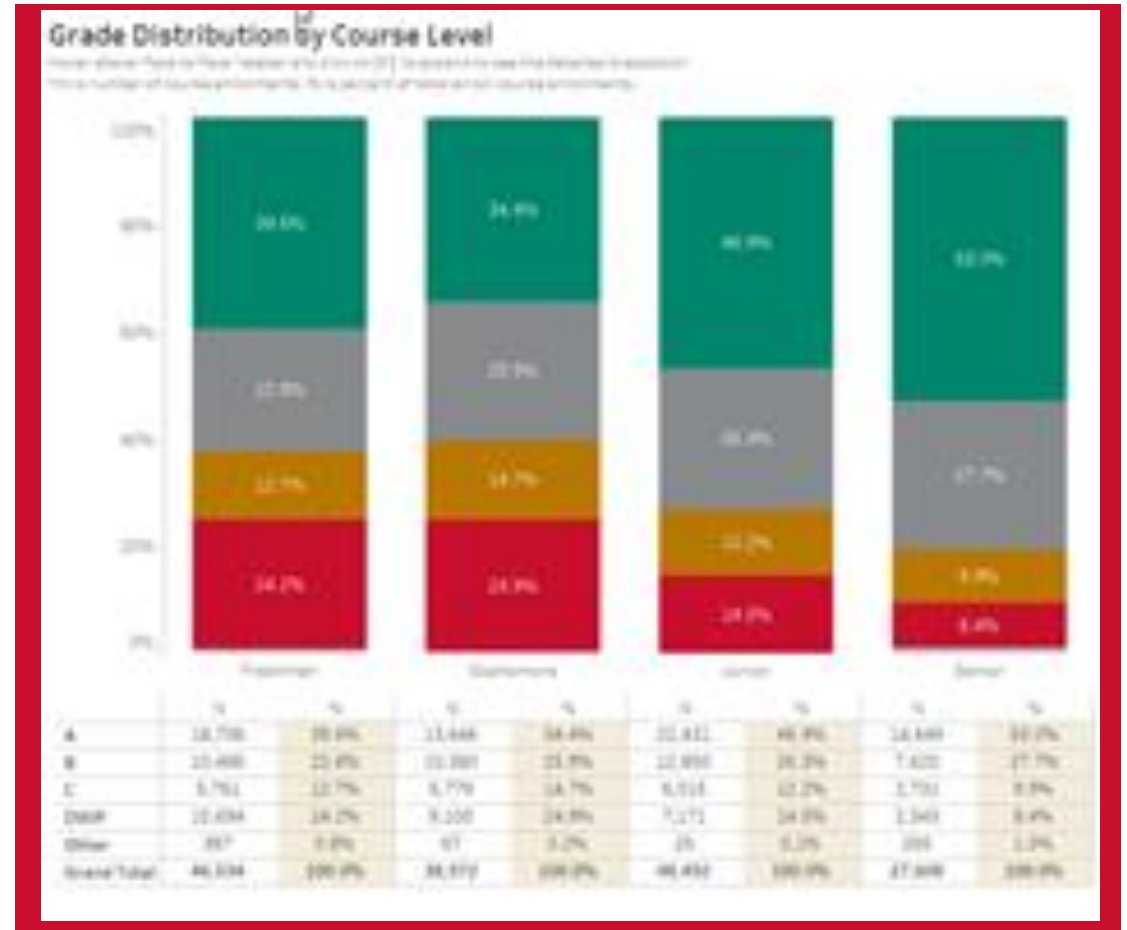
Test! Test! Test some more!

Stage 4: Did our dashboard ideas work with test data?

- Two-way Iterative in nature
- Dashboard issues addressed through weekly Tableau meetings.
- Data issues addressed with the data warehouse team.

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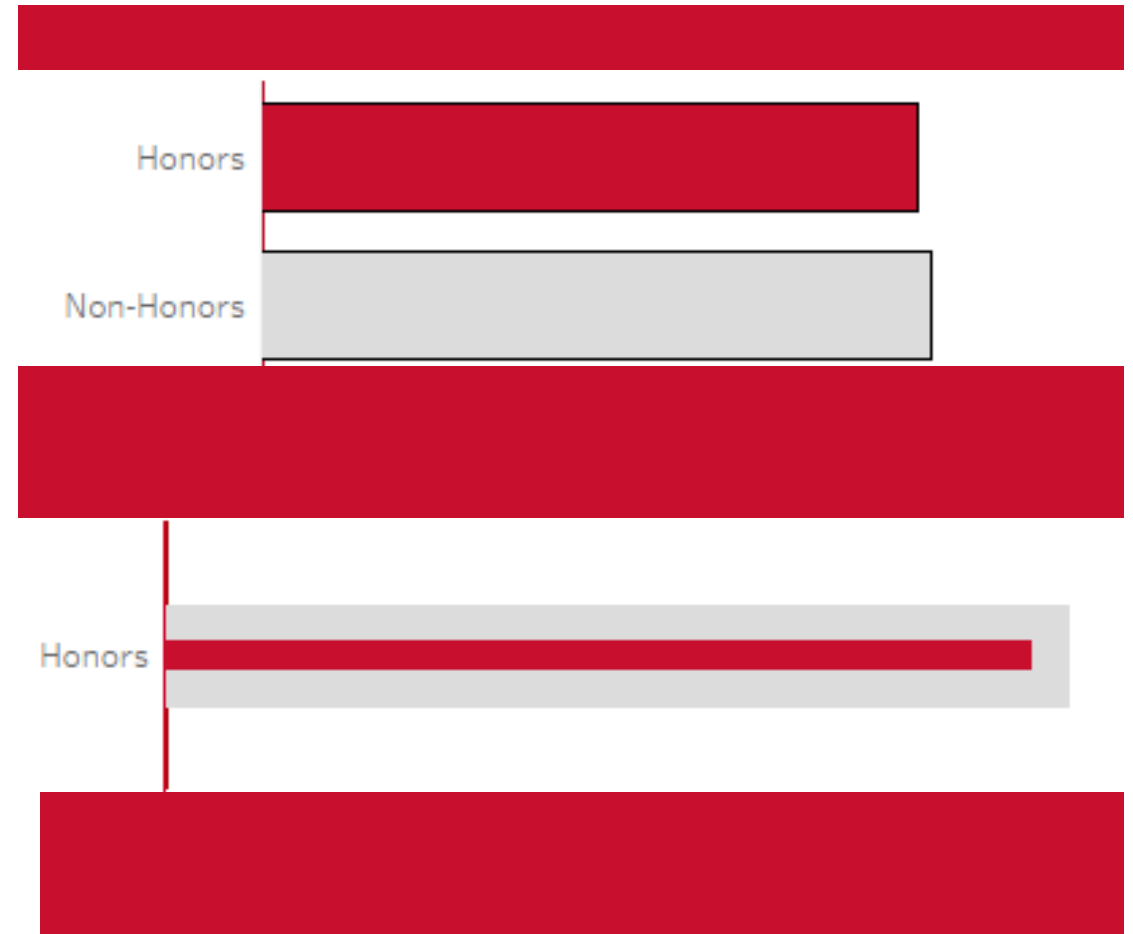
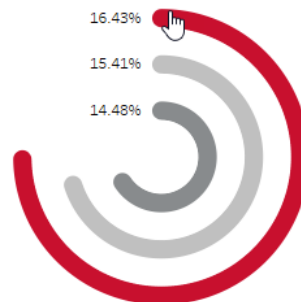
It is not a linear process!



Stage 4: Working the dashboard through test data

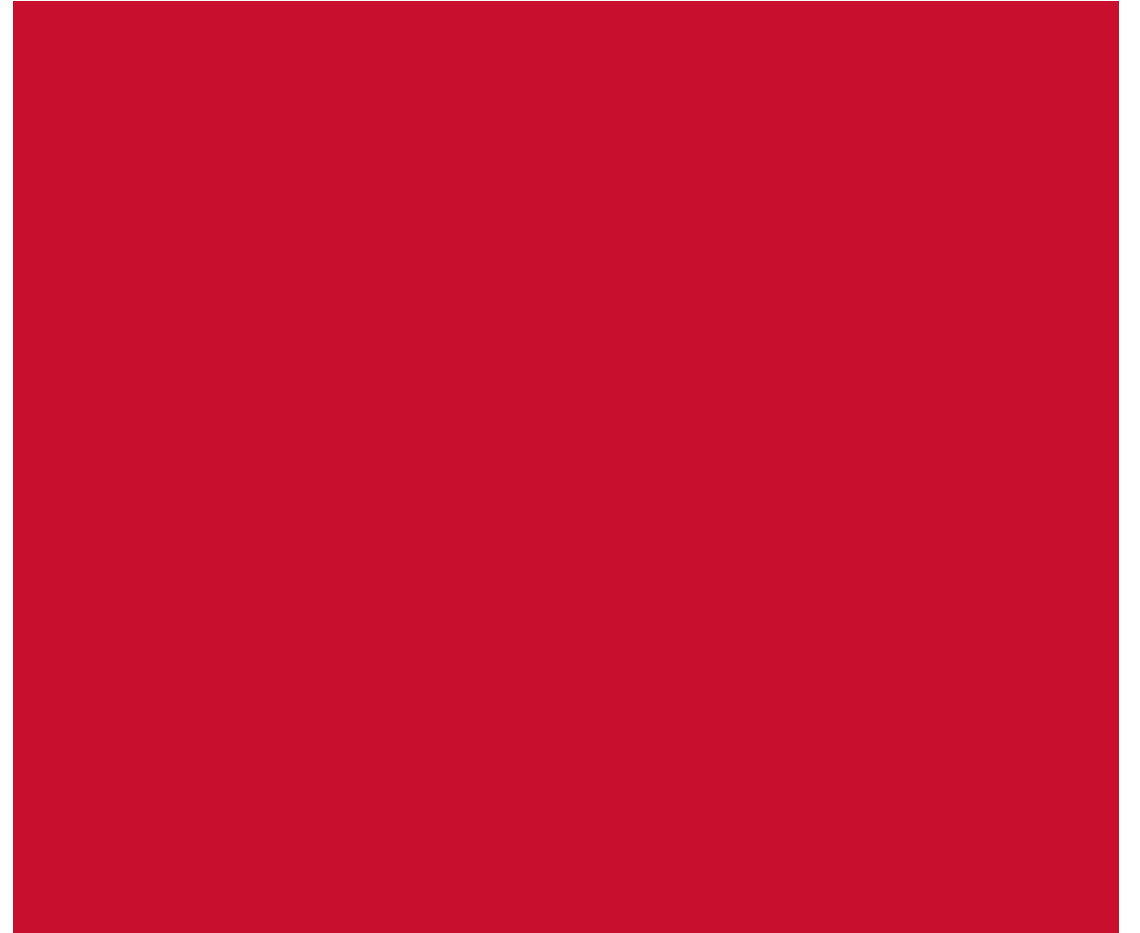
- Some Issues:
 - Bar in bar vs. regular bar chart?
 - Generic charts vs. fancy charts?
 - How much detail? (custom table)
 - Multiple measures in one dashboard? (e.g., GPA, DWIF, SCH..)
 - Multiple dimensions in one dashboard?
 - One dimension filters out data

DWIF Rate by Instruction Mode



Stage 4: Points to consider

- Usefulness
- User-friendliness
- Maintainability
- Aesthetics



Stage 5: How could we link up real data with our dashboard in a production environment?

Create a Custom Table

Select the dimensions to create a custom table

Dimension 1: College Dimension 2: Department Dimension 3: Course Level

	Feb 2020		Feb 2021	
	SI	Aug 2019	SI	Aug 2019
Architecture	2,494	2,148	2,615	2,088
Total	2,494	2,148	2,615	2,088
Arts	7,877	5,301	6,622	5,028
Total	7,877	5,301	6,622	5,028
Business	24,712	2,398	24,434	3,000
Total	24,712	2,398	24,434	3,000
Class	80,282	2,900	80,233	2,890
Total	80,282	2,900	80,233	2,890
Education	9,327	3,490	8,874	3,339
Total	9,327	3,490	8,874	3,339
Engineering	7,904	2,719	7,794	2,719
Total	7,904	2,719	7,794	2,719
Exploratory Studies	304	3,490	446	3,219
Total	304	3,490	446	3,219
Gen	3,139	3,118	2,881	3,118
Total	3,139	3,118	2,881	3,118
Health	46,547	2,544	42,749	2,217
Total	46,547	2,544	42,749	2,217
Nursing	491	3,510	490	3,710
Total	491	3,510	490	3,710
Social Work	16	3,219	10	3,900
Total	16	3,219	10	3,900
Technology	15,826	2,944	14,097	2,810
Total	15,826	2,944	14,097	2,810

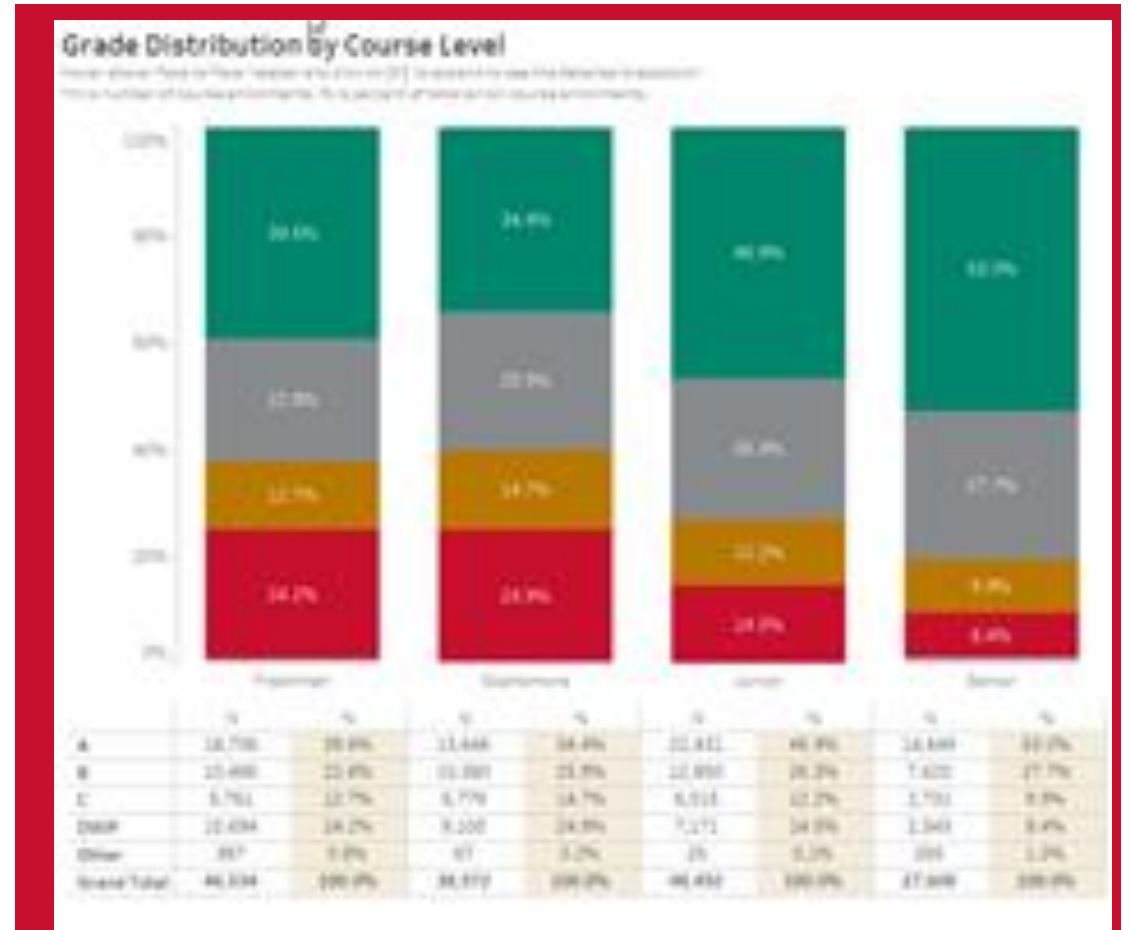
Filters: Select: Average GPA, Course Level: Undergraduate, Semester: Feb 2020 & Feb 2021, College: SI, Department: Architecture, Course Level: Undergraduate, Subject: SI, Course: SI, Core: SI, Minors: SI, Study Method: SI, Off Campus: SI

- Data issues resolved
- Dashboard concepts validated
- Tableau extract created in the production environment.
- Data source switched to production data.
- New issues subsequently addressed

7 *Be flexible! Deal with new issues as they arise!*

Stage 6: How could we ensure that our dashboards are maintained and updated?

- Have a maintenance plan.
 - Identify the individuals responsible for the data source and the dashboard.
 - Be responsive to the feedback from actual users.
 - Develop documentation



Dashboard Demo

- [Course Grade Performance](#)

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Any questions?