

Meet Campus Bites

Campus food delivery service



You've just been hired as a data analyst.

The CEO walks into your office and says:

"Orders dropped 20%.

Recommend a fix in 2 hours."

(Marketing) Analytics Mindset: Solving Problems with Data

1. **Understand analytics:**

Turn data into insights that drive decisions

2. **Apply descriptive analytics:**

Answer "What happened?"

3. **Apply diagnostic analytics:**

Answer "Why did it happen?"

4. **Tell a story with data:**

Communicate findings persuasively with insight slides

<https://r.isba.co/best-analytics>



Find it here - **faster.**



- Full-Stack Web Developer
- System/Network Admin
- CTO
- Data Analyst
- Data Engineer
- Data Scientist
- Problem Solver



What is analytics?

<https://PollEv.com/lontok>

Where do you see analytics?

<https://PollEv.com/lontok>

You're given a spreadsheet. How do you proceed?

What do you ask?

What is your first step?

Next steps?

Store	Dept	Date	Weekly_Sales	IsHoliday
1	4	5/2/10	24924.5	FALSE
NULL	4	12/2/10	46039.49	TRUE
2	1	19/02/2010	41595.55	FALSE
3	1	26/02/2010	19403.54	FALSE
5	2	5/3/10	21827.9	FALSE
5	2	12/3/10	21043.39	FALSE
5	3	2010-10-18	22136.64	TRUE
2	3	26/03/2010	26229.21	FALSE
3	1	2/4/10	57258.43	FALSE
3	4	9/4/10	42960.91	FALSE

Do you have an analytics process?

What are your steps to solve an analytics problem?



yes



no

We need a standardized process

- Replicate similar projects - checklist
- Aid project management
- Best practices for more predictable results

Too many teams jump to start "doing the work"

But, are still confused about what the stakeholder wants



**Too many teams jump to
AI before doing analytics**

8	1	6	7	6	0	1	5	4	7	0	6	8	4	8	2	5	1	0	5	1	/	3	3	3	7	4	0	0	3	3	0		
7	3	2	6	4	4	7	2	5	7	4	7	8	4	1	0	8	0	4	9	4	1	/	2	3	0	6	0	2	5	2	0	5	
1	8	2	5	1	1	6	8	5	2	4	1	8	6	7	8	1	6	8	8	0	2	3	5	5	2	4	1	1	1	1			
3	3	8	1	1	7	5	8	5	5	1	7	3	7	0	3	3	3	2	8	3	5	8	0	1	1	1	1	1	1	1			
1	1	2	5	2	3	2	2	0	8	5	1	0	0	5	1	0	5	0	0	1	1	1	1	1	1	1	1	1	1	1			
2	2	7	1	2	8	3	0	0	0	2	7	1	2	8	3	0	0	0	2	7	1	2	8	3	0	0	0	0	0	0			
+	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
8	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
0	6	6	3	8	6	7	2	0	2	6	5	4	8	6	1	0	0	5	6	0	8	5	8	2	3	6	1	7	1	1	1		
4	4	3	7	6	8	7	5	6	7	5	2	0	6	6	1	2	1	8	3	4	5	6	6	2	3	4	7	6	3	1	1	1	
1	1	1	7	1	7	8	3	4	8	8	8	2	2	4	0	5	8	3	8	5	7	5	4	7	0	5	2	4	1	7	1	1	1
2	2	6	0	0	1	5	7	6	7	7	2	0	0	6	5	8	2	1	8	8	6	0	8	0	0	1	2	6	0	3	5	0	
6	6	8	0	0	2	0	2	2	3	0	6	7	0	7	5	6	3	6	2	6	8	6	1	2	6	4	4	1	0	2	1		
1	1	7	4	5	7	1	3	2	3	6	4	8	3	8	5	0	4	1	7	3	7	6	1	0	6	1	1	1	3	1	1	1	
7	7	4	6	7	8	8	3	7	0	6	6	1	5	0	0	6	6	0	4	5	6	1	8	8	7	0	7	8	0	0	0	0	
8	8	5	6	3	7	0	1	1	6	1	8	0	5	5	7	6	7	8	6	4	5	4	4	3	6	5	3	4	0	4	2	5	4
4	4	4	1	4	2	6	0	5	7	6	2	0	3	3	3	4	7	7	4	5	1	6	6	5	5	2	0	1	1	2	5	0	
7	7	3	3	3	7	8	8	4	3	7	1	4	8	1	6	5	1	5	5	6	0	8	4	3	4	4	8	1	8	7	4	1	7
5	5	3	6	8	4	5	0	3	0	2	2	0	8	0	6	4	2	1	8	3	6	7	0	7	1	1	6	6	4	5	5	6	
3	3	1	2	1	5	0	6	3	8	7	2	2	7	0	5	4	6	5	5	8	5	2	6	8	0	7	3	7	5	4	8	1	4
2	2	4	1	5	6	3	5	3	1	4	2	8	4	2	8	3	1	3	5	8	2	7	1	7	1	0	2	3	5	7	6	6	
4	4	3	7	3	6	5	2	0	4	2	2	0	6	5	1	8	1	3	1	4	7	5	1	4	5	2	1	0	6	0	0	0	
3	3	6	8	0	4	8	3	7	3	3	7	2	4	8	1	7	8	2	6	3	8	0	2	3	4	8	0	5	2	4	2	0	
8	8	1	0	6	7	8	6	2	6	5	2	1	1	0	1	2	6	8	3	5	1	3	6	6	2	2	3	8	0	4	6	0	
6	6	1	1	6	0	4	8	4	4	0	4	7	5	1	3	7	2	4	7	7	1	2	2	3	2	6	7	4	6	2	6	7	2
7	7	1	6	7	2	7	0	4	8	3	5	0	2	0	5	2	4	7	1	8	5	1	0	7	8	2	5	8	6	5	1	3	
7	7	1	4	5	7	5	8	7	1	3	2	2	0	6	0	7	3	6	8	7	7	4	2	8	1	7	5	0	5	2	3		

**Too many teams jump to
preparing the data before
defining the business problem**

Meet Campus Bites

Campus food delivery service



You've just been hired as a data analyst.

The CEO walks into your office and says:
"Orders dropped 20%. Fix this."

What do you do first?

???

5-Step Analytics Framework

1. **Define** the business problem
2. **Collect** and prepare the data
3. **Analyze** the data and generate insights
4. **Communicate** the insights, recommendations, and predictions
5. **Act** and track the change

DC ACT

5-Step Analytics Framework

1. **Define** the business problem
2. **Collect** and prepare the data
3. **Analyze** the data and generate insights
4. **Communicate** the insights, recommendations, and predictions
5. **Act** and track the change

DC ACT

CEO's Problem Statement

"Orders dropped 20%. Fix this."

Is this a good problem definition? What's missing?

From Vague to Specific

Good/ OK	<i>"Orders dropped 20%. Recommend a fix."</i>	What + Now What
Better	<i>"Orders dropped 20% in October. Where did the drop happen? Recommend a fix."</i>	What + Where + Now What
Best	<i>"Orders dropped 20% in October vs September. Where did the drop happen and why? Recommend a fix."</i>	What + Where + Why + Now What

**You learned everything you need to know
about identifying the problem in
kindergarten**



Understand the problem with 5W2H

What?

Why?

Who?

When?

Where?

How?

How Much?



"Orders dropped 20% in October vs September. Where did the drop happen and why? Recommend a fix."

Start with:

- What happened (specific metric)
- How much it changed (magnitude)
- When it happened (timeframe)

5-Step Analytics Framework

1. **Define** the business problem
2. **Collect** and prepare the data
3. **Analyze** the data and generate insights
4. **Communicate** the insights, recommendations, and predictions
5. **Act** and track the change

DC ACT

Campus Bites Dataset

<https://r.isba.co/campus-bites-data>

When starting out, you'll inherit an existing dashboard, report, Excel workbook before creating a data product.

5-Step Analytics Framework

1. **Define** the business problem
2. **Collect** and prepare the data
3. **Analyze** the data and generate insights
4. **Communicate** the insights, recommendations, and predictions
5. **Act** and track the change

DC ACT

4 STAGES OF DATA ANALYTICS MATURITY



Descriptive
Analytics



Diagnostic
Analytics



Predictive
Analytics



Prescriptive
Analytics

What are we trying to answer?

1. Descriptive: *What happened?*
2. Diagnostic: *Why it happened?*
3. Predictive: *What will happen?*
4. Prescriptive: *What should we do?*

Today's Focus

1. Descriptive: *What happened?*
2. Diagnostic: *Why it happened?*
3. Predictive: *What will happen?*
4. Prescriptive: *What should we do?*

Descriptive Analytics: *What happened?*

Focuses on historical data

Aggregations

Visualizations

	A	B	C	D	E	F	G
3	Order #	Order Date	Customer #	Customer Name	Address	City	State
4	1015	01/27/14	27	Company AA	789 27th Street	Las Vegas	Nev
5	1015	01/27/14	27	Company AA	789 27th Street	Las Vegas	Nev
6	1016	01/27/14	4	Company D	123 4th Street	New York	NY
7	1016	01/27/14	4	Company D	123 4th Street	New York	NY
8	1016	01/27/14	4	Company D	123 4th Street	New York	NY
9	1017	01/27/14	12	Company L	123 12th Street	Las Vegas	Nev
10	1017	01/27/14	12	Company L	123 12th Street	Las Vegas	Nev
11	1018	01/28/14	8	Company H	123 8th Street	Portland	Ore
12	1019	01/28/14	4	Company D	123 4th Street	Portland	Ore
13	1020	01/29/14	29	Company CC	789 25th Street	Chicago	Ill
14	1021	01/29/14	3	Company C	123 3rd Street	Chicago	Ill
15	1021	01/29/14	4	Company D	123 4th Street	Chicago	Ill
16	1023	01/29/14	26	Company BB	789 20th Street	Seattle	Wash
17	1024	01/28/14	8	Company H	123 8th Street	Seattle	Wash
18	1025	01/10/14	10	Company J	123 10th Street	Seattle	Wash
19	1026	01/07/14	7	Company G	123 7th Street	Seattle	Wash
20	1027	01/10/14	10	Company J	123 10th Street	Seattle	Wash
21	1027	01/10/14	10	Company J	123 10th Street	Seattle	Wash
22	1027	01/10/14	10	Company J	123 10th Street	Seattle	Wash
23	1028	01/11/14	11	Company K	123 11th Street	Milan	Italy
24	1028	01/11/14	11	Company K	123 11th Street	Milan	Italy
25	1028	01/01/14	1	Company A	123 1st Street	Seattle	Wash
26	1029	01/01/14	1	Company A	123 1st Street	Seattle	Wash
27	1029	01/01/14	1	Company A	123 1st Street	Seattle	Wash
28	1030	01/28/14	28	Company BB	789 28th Street	Menlo Park	Calif
29	1030	01/28/14	28	Company BB	789 28th Street	Menlo Park	Calif
30	1031	01/09/14	9	Company I	123 9th Street	Salt Lake City	Utah
31	1032	01/09/14	9	Company I	123 9th Street	Salt Lake City	Utah
32	1032	01/09/14	6	Company F	123 6th Street	Portland	Ore
33	1032	01/09/14	8	Company H	123 8th Street	Portland	Ore
34	1034	02/03/14	3	Company C	123 3rd Street	Los Angeles	Calif
35	1034	02/03/14	3	Company C	123 3rd Street	Los Angeles	Calif



Ask Descriptive Questions

For Campus Bites, what "*what happened*" questions to ask?

<https://PollEv.com/lontok>

Think of 2 questions that start with:

- **How many...** (counts, frequencies)
- **What was the typical...** (mean, median, mode)
- **What was the total...** (sums, revenue, volume)
- **How did it change over time?** (trends, comparisons)
- **Which group had the most/least...?** (distributions, rankings)

Strategic Dashboard: What the CEO sees

<https://r.isba.co/best-strategic>

The 3 Most Common Chart Types

Chart Type	Best For	Example
Scorecard/KPI	Single important numbers	Total Revenue: \$11,859
Line Chart	Trends over time	Orders by month
Bar Chart	Comparing categories	Orders by segment

Column Chart (Vertical Bars)

vs

Bar Chart (Horizontal Bars)

"Orders dropped 20% in October vs September. Where did the drop happen and why? Recommend a fix."

Start broad then drill down:

What was the total # of orders in Sep and Oct?

Diagnostic Analytics: *Why it happened?*

Uncovers the drivers and root causes behind outcomes

Start from Descriptive Analytics

Investigate causes for symptoms

"Orders dropped 20% in October vs September. Where did the drop happen and why? Recommend a fix."

Start broad then drill down.

- What was the total # of orders in Sep and Oct?
- **How many orders per segment?**
- **What are the segments? (dimensions)**

<https://r.isba.co/campus-bites-data>

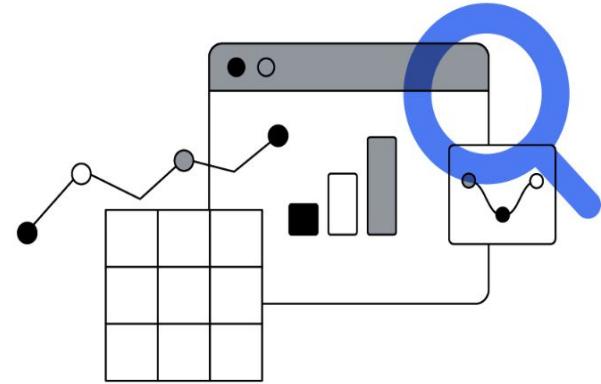
???, ???, ???, ???

Analytical Dashboard: Where you investigate the drivers behind the metrics

<https://r.isba.co/best-analytical>

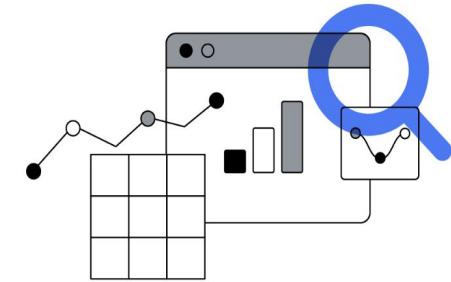
How to generate insights

- Highest/lowest values?
 - Anomalies/outliers?
 - Unexpected/surprising results?
 - Trends or patterns?
 - Correlations/relationships?
-
- In a group
 - Compared to other groups



ACTIONABLE?

Insight Patterns



- Trends (over time) - What's changing?
- Ranking - What's best/worst?
- Contribution (%) - Who/what drives the total?
- Comparisons - How do groups stack up?
Period-over-Period: current vs prior period
- Outliers - What stands out?
- Relationships - What moves together?

"Orders dropped 20% in October vs September. Where did the drop happen and why? Recommend a fix."

<https://r.isba.co/best-analytical>

Create a takeaway slide title

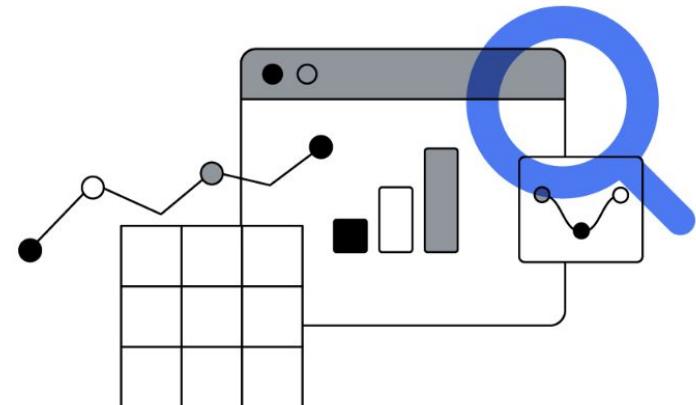
The.Most.Important.Part.Of.The.Slide

What is the main insight?

Key message?

The main takeaway.

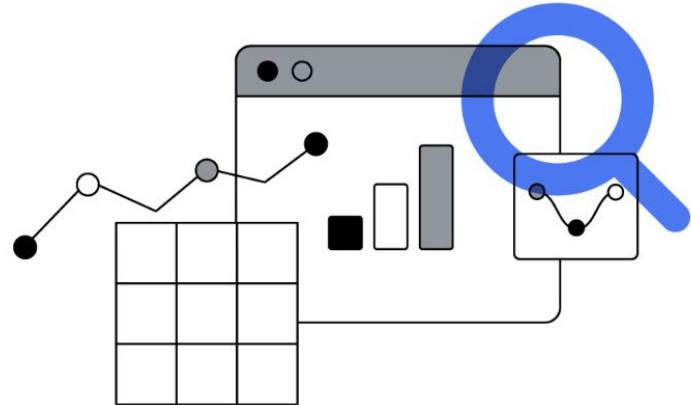
The "So What"



Takeaway slide title formula

Contains these elements (order is up to you):

- Metric
- Dimension (Segment)
- Direction
- Magnitude



Oct orders dropped 20% vs Sept

Monthly Performance Trend



Metric? Dimension? Direction? Magnitude?

Storytelling with Data:

Create an insight slide title

1. Form 6 groups of 5-6
 2. Fill in the slide below
associated to your
group #
 3. You can use AI
- Flex your prompt
engineering skills



**10
MINUTES**

Use the Analytical Dashboard

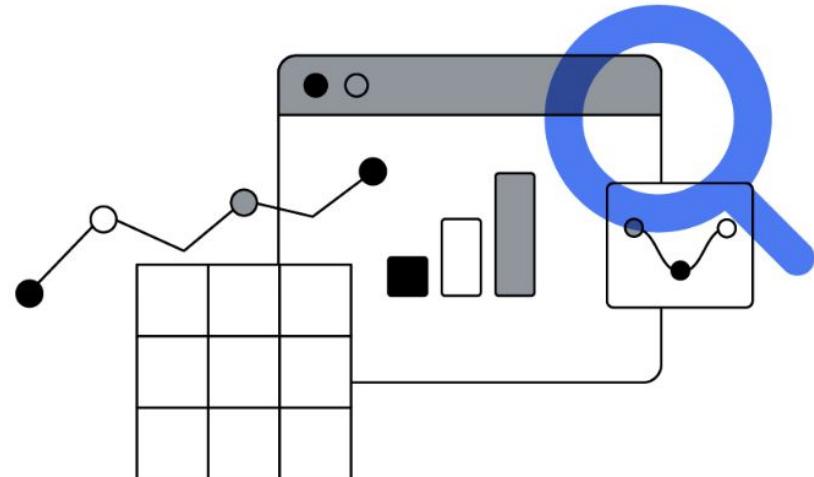
<https://r.isba.co/best-analytical>

Calculate percentage change as needed:

(New Value - Old Value) ÷ Old Value × 100

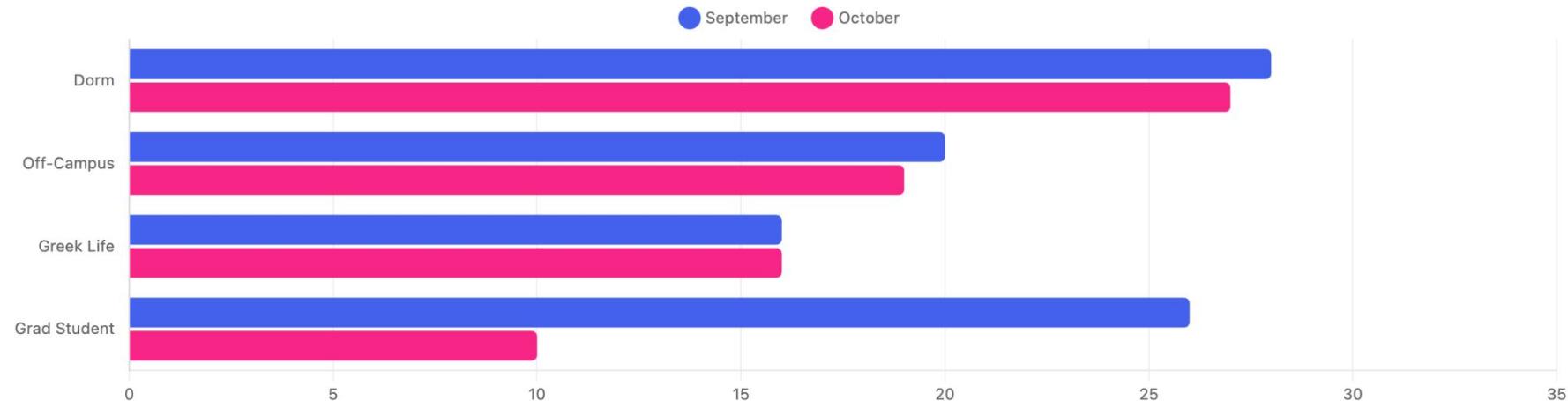
Looking for inspiration?

Chartr Newsletters



October Orders Fall 20% Overall with Grad Students Driving the Drop; Grad Orders “FALL” by 61.5%

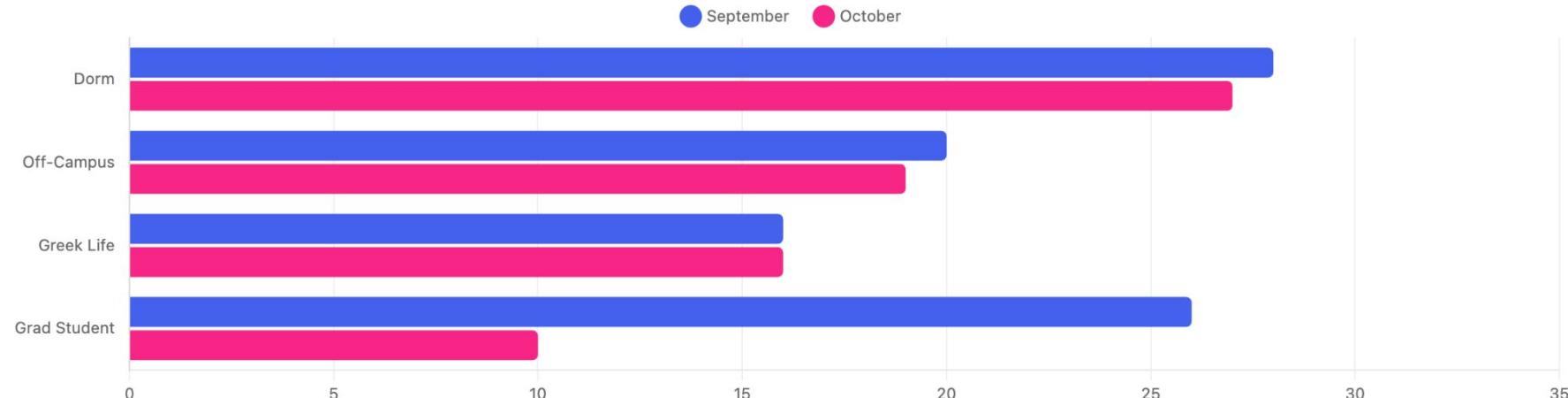
Orders by Segment: September vs October (Month-over-Month)



Group 01

Haunted by Midterms: Grad Student Orders Collapse by 61%

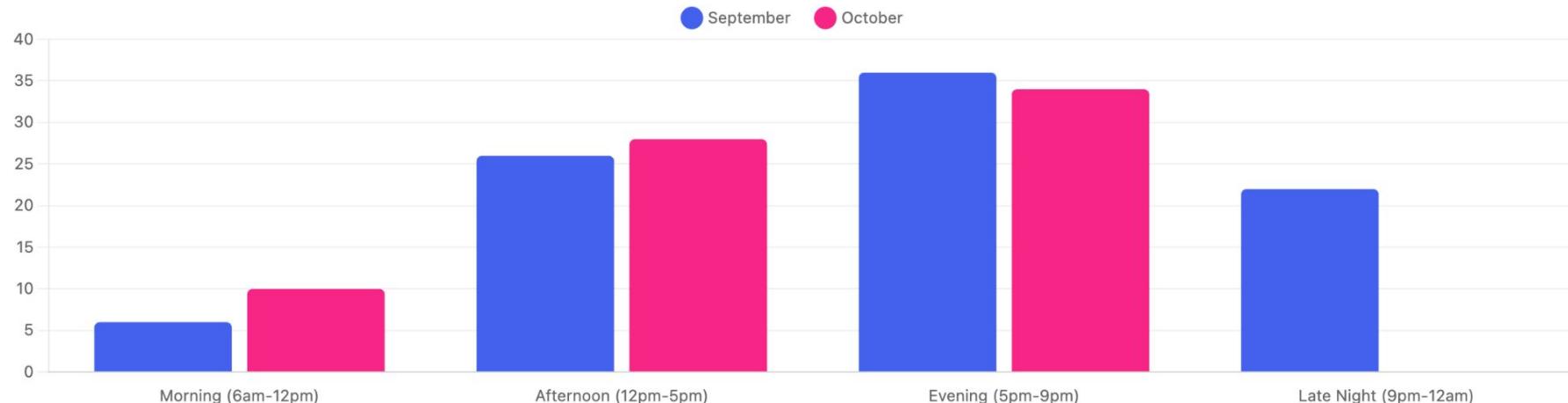
Orders by Segment: September vs October (Month-over-Month)



Group 02

Late Night Orders Drop to Zero in October

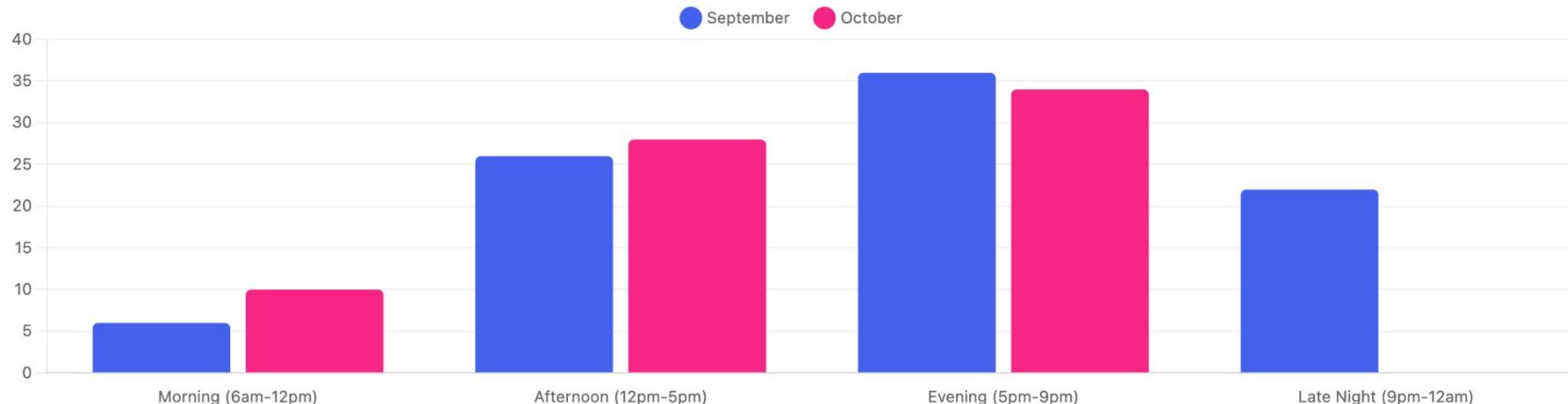
Orders by Time of Day: September vs October



Group 03

Morning and Afternoon Orders Rise by 18% as Late Night Demand Disappears

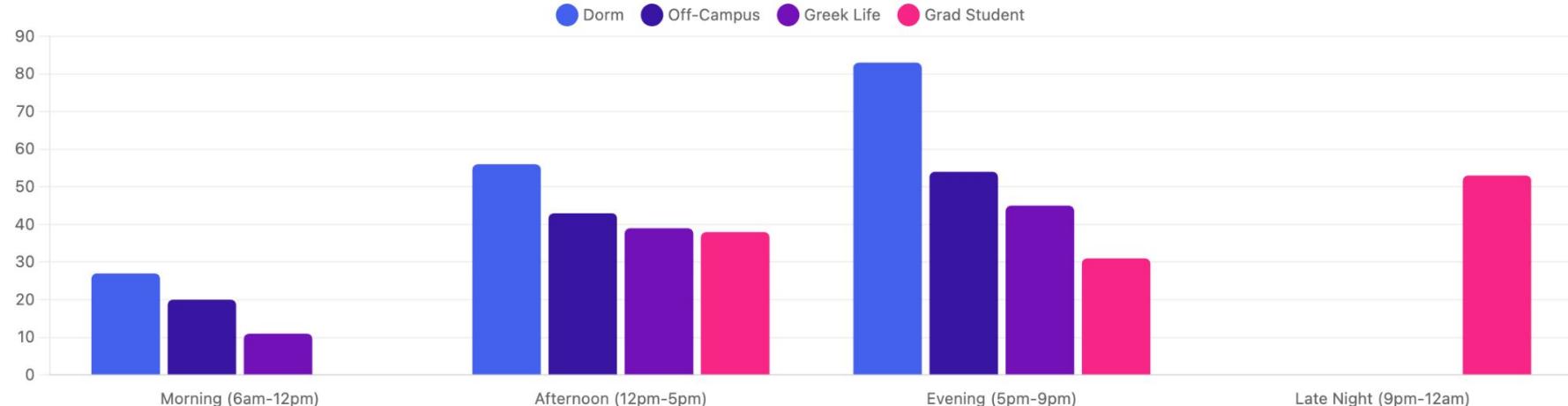
Orders by Time of Day: September vs October



Group 04

Grad students' order volume & time trends polar to Undergraduates

Orders by Time of Day by Customer Segment (All Months)

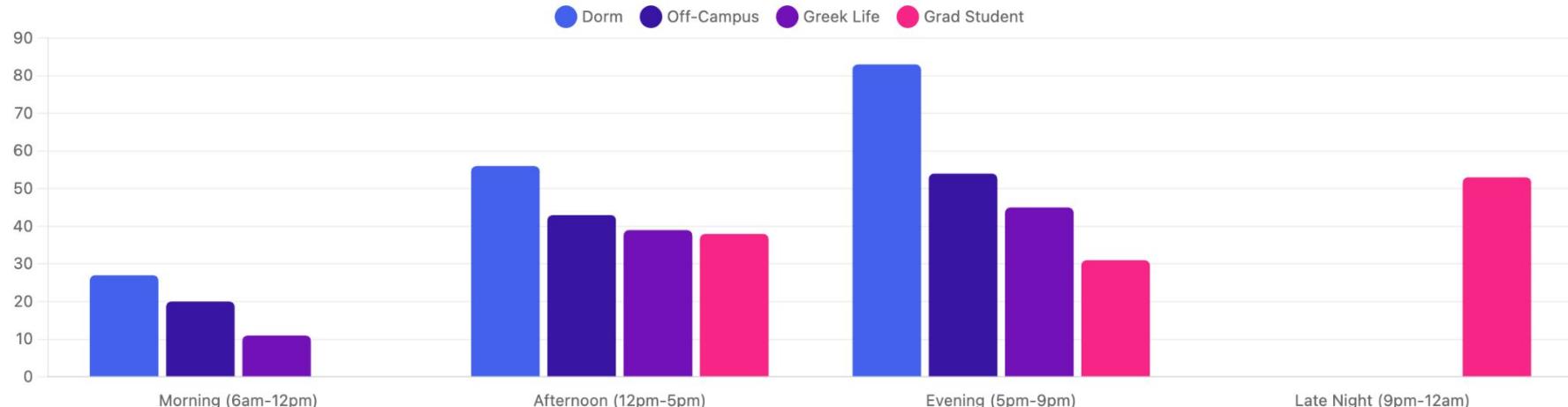


Group 05

Late night orders reach a deficit of 0% within Undergrad Students



Orders by Time of Day by Customer Segment (All Months)



Group 06

Based on these insights, what is the recommendation?

Recommendation: ???

Prediction (Value): ???

Analytics solves problems when it drives actions

What you practiced today:

- Defined a clear, specific problem
- Used descriptive analytics to ask "what happened?"
- Used diagnostic analytics to drill down into the data to spot patterns to answer "why it happened?"
- Framed insight slide titles that tell the story
- Recommended actions based on evidence