Delta Deliverables
Analysis of Skyclub Surveys
December 10, 2015

Sherry Ni, Ph.D.
Quinn Anderson, MSAS
John Michael Croft, MSAS
Brandon Stringfield, MSCS

Center for Statistics and Analytical Services
Kennesaw State University

Project Goals?

The current project has two objectives:

Evaluate Skyclubs survey scores based on:
- ✓ Club Tier
- ✓ Club Group

Examine Text in comments by:
- ✓ Club Tier
- ✓ Club Group
- ✓ Region
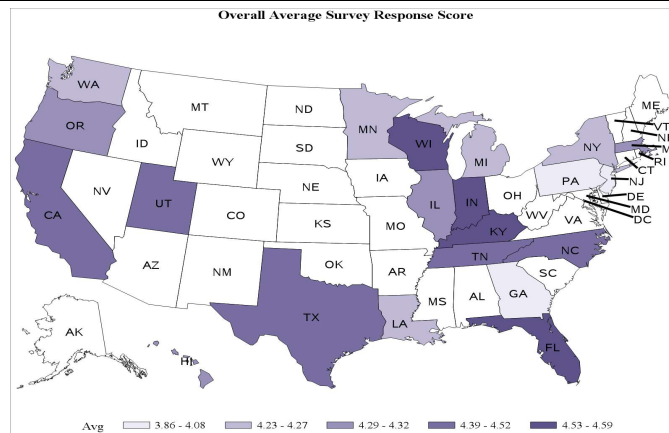- ✓ Facility, Policy, Products and Service
- ✓ Rating

Kennesaw State UNIVERSITY
Center for Statistics
and Analytical Services

Process –

Comments

Numeric Scores (1-5)

Center for Statistics
and Analytical Services

Overall Averages by State

State	Average
WI	4.59
FL	4.58
KY	4.56
IN	4.53
TN	4.52
NC	4.42
TX	4.42
UT	4.42
CA	4.39
OR	4.32
HI	4.31
MA	4.31
DC	4.29
IL	4.29
NY	4.27
MI	4.25
LA	4.23
WA	4.23
MN	4.23
Japan	4.20
GA	4.08
Chile	4.07
PA	4.01
NJ	3.86

Center for Statistics
and Analytical Services

Observations

- Overall the scores for Question 1 are near the goal of 4.35.
- NJ lowest scoring area at 3.86.
- GA is at a 4.08.
- Top 3 scoring states are WI, FL and KY.

Heat Map – Survey Questions by Tier

	Overall	Cleanliness	Comfortable	Staff	Communication	Wifi	Food Quality	Food Quantity	Food Variety	Beverage Quality	
Tier 1	4.24	4.37	4.10	4.35	4.36	4.17	3.76	3.85	3.45	4.01	
Tier 2	4.34	4.43	4.21	4.51	4.51	4.26	3.90	4.01	3.62	4.13	
Tier 3	4.36	4.44	4.22	4.51	4.51	4.29	3.95	4.05	3.69	4.18	

Observations – Survey Questions by Tier

- Overall the scores for Question 1 are near the goal of 4.35.
- Tier 1 scores the lowest across every question.
- Tier 3 scores the highest across every question.
- Less of a difference between the scores for the different tiers.
- Marginal difference in scores between Tier 2 and Tier 3.
- Food related questions tend to score lowest.

Heat Map – Survey Questions by Group

	Overall	Cleanliness	Comfortable	Staff	Communication	Wifi	Food Quality	Food Quantity	Food Variety	Beverage Quality	
	4.22	4.34	4.06	4.37	4.38	4.18	3.79	3.90	3.51	4.06	Group 1
	4.38	4.47	4.29	4.49	4.50	4.27	3.92	4.03	3.63	4.15	Group 2
	4.41	4.51	4.30	4.58	4.57	4.31	3.96	4.05	3.67	4.15	Group 3

Observations – Survey Questions by Group

- Overall the scores for Question 1 are near the goal of 4.35.
- Group 1 scores the lowest across every question.
- Group 3 scores the highest across every question.
- Food related questions tend to score lowest.
- There's a notable drop in the score for Comfort in Group 1.

Center for Statistics
and Analytical Services

What are people saying? – Overall Comments

R-generated Word Cloud for All Comments
Top 100 words in all comments

Key:
Blue = Products
Green = Service
Purple = Facility
Red = Policy
Brown = Other

Notes:
- Food is the most frequently mentioned word.
- Staff is also mentioned frequently.
- Many positive descriptive words.

Center for Statistics
and Analytical Services

What are people saying? – by Region

Top words by region:

	atl	east	west	midwest
1	food	food	food	food
2	good	staff	staff	staff
3	staff	great	great	great
4	better	better	new	like
5	bar	good	like	better
6	crowded	like	nice	good
7	like	nice	good	nice
8	great	always	better	always
9	time	time	bar	bar
10	people	bar	time	time
11	small	best	wifi	people
12	nice	wifi	always	new
13	need	people	people	choices
14	coffee	service	excellent	need
15	room	experience	lax	service
16	experience	visit	best	coffee
17	concourse	choices	experience	wifi
18	choices	excellent	service	crowded
19	always	desk	need	please
20	atlanta	crowded	sfo	experience

Notes:
- Food is the first term for every region.
- Staff is the second or third term for every region.
- Positive adjectives are common in the top 10 for all regions.
- Crowded is in the top 20 words for ATL, East and Midwest.

Center for Statistics
and Analytical Services

What are people saying? – Tier 1

R-generated Word Cloud for
Tier 1 Comments
Top 40 words in comments

Key:
Blue = Products
Green = Service
Purple = Facility
Red = Policy
Brown = Other

Notes:
- Food is the most frequently mentioned word.
- Many positive descriptive words.
- Policy terms are mentioned least frequently

Center for Statistics
and Analytical Services

What are people saying? – Tier 2

R-generated Word Cloud for
Tier 2 Comments
Top 40 words in comments

Key:
Blue = Products
Green = Service
Purple = Facility
Red = Policy
Brown = Other

Notes:
- Food is the most frequently mentioned word.
- Many positive descriptive words.
- Policy terms are mentioned least frequently.

13

Kennesaw
State UNIVERSITY
Center for Statistics
and Analytical Services

What are people saying? – Tier 3

R-generated Word Cloud for
Tier 3 Comments
Top 40 words in comments

Key:
Blue = Products
Green = Service
Purple = Facility
Red = Policy
Brown = Other

Notes:
- Food is the most frequently mentioned word.
- Staff becomes more frequently mentioned.

14

Kennesaw
State UNIVERSITY
Center for Statistics
and Analytical Services

What are people saying? – by Tiers

Top words by tier:

	tier 1	tier 2	tier 3
1	food	food	food
2	staff	staff	staff
3	better	great	great
4	great	good	new
5	like	like	good
6	good	always	nice
7	bar	nice	like
8	time	better	better
9	nice	time	bar
10	people	bar	time
11	wifi	people	always
12	crowded	wifi	best
13	experience	visit	small
14	service	service	people
15	choices	best	crowded
16	always	choices	coffee
17	new	need	need
18	options	small	wifi
19	need	experience	excellent
20	really	new	service

Notes:
- Food is the first term for every region.
- Staff is the second for every region.
- Positive adjectives are common in the top 10 for all regions.
- Crowded and small are prominent terms across the tiers.
- New is also a prominent term in all tiers.

Kennesaw State UNIVERSITY
Center for Statistics and Analytical Services

What are people saying? – Group 1

R-generated Word Cloud for Group 1 Comments
Top 40 words in comments

Key:
Blue = Products
Green = Service
Purple = Facility
Red = Policy
Brown = Other

Notes:
- Staff is as frequently mentioned as Food.
- Policy terms are mentioned least frequently.

Kennesaw State UNIVERSITY
Center for Statistics and Analytical Services

What are people saying? – Group 2

R-generated Word Cloud for
Group 2 Comments
Top 40 words in comments

Key:
Blue = Products
Green = Service
Purple = Facility
Red = Policy
Brown = Other

Notes:
- Staff is as frequently mentioned as Food.
- Policy terms are mentioned least frequently.

Kennesaw
State UNIVERSITY
Center for Statistics
and Analytical Services

What are people saying? – Group 3

R-generated Word Cloud for
Group 3 Comments
Top 40 words in comments

Key:
Blue = Products
Green = Service
Purple = Facility
Red = Policy
Brown = Other

Notes:
- Staff is as frequently mentioned as Food.
- Policy terms are mentioned least frequently.

Kennesaw
State UNIVERSITY
Center for Statistics
and Analytical Services

What are people saying? – by Groups

Top words by group:

	group 1	group 2	group 3
1	food	food	staff
2	staff	staff	food
3	great	great	great
4	better	good	always
5	like	like	good
6	good	nice	nice
7	new	better	like
8	bar	always	better
9	nice	time	best
10	time	bar	bar
11	people	best	time
12	crowded	wifi	people
13	wifi	please	wifi
14	experience	choices	small
15	need	people	service
16	service	visit	visit
17	always	options	excellent
18	choices	service	new
19	coffee	experience	choices
20	really	desk	desk

Notes:
- Food and Staff are in the top 1 and positions for all Groups.
- Positive adjectives are common in the top 10 for all regions.
- Crowded only appears Group 1.

Kennesaw State UNIVERSITY
Center for Statistics
and Analytical Services

What are people saying? – Facility

Top words associated with the facility:

	wifi	crowded	experience	room	seating	space	area	place	chairs	lounges	comfortable	clean
1	slow	food	food	bathroom	food	food	food	sit	comfortable	food	chairs	staff
2	food	small	great	food	comfortable	crowded	areas	food	food	like	uncomfortable	food
3	better	overcrowded	staff	bathrooms	crowded	small	bar	crowded	new	better	seating	cleaning
4	access	space	good	restroom	area	people	like	staff	need	good	food	cleaned
5	password	people	better	mens	small	great	seating	like	people	staff	new	dirty
6	staff	staff	always	staff	outlets	staff	staff	nice	like	nice	staff	time
7	connection	sit	time	small	like	work	people	people	tables	choices	like	bathroom
8	good	place	like	restrooms	people	like	quiet	great	uncomfortable	airlines	crowded	always
9	work	room	overall	people	space	need	crowded	places	staff	great	nice	good
10	speed	always	excellent	clean	enough	seating	better	time	nice	offer	space	tables

Notes:
- Easy access to Wifi and the speed of the Wifi are important.
- Available space and feeling Crowded is a common complaint.
    - People is mentioned frequently in conjunction with Space as well as Overcrowded.
- Cleanliness is mentioned.

Kennesaw State UNIVERSITY
Center for Statistics
and Analytical Services

What are people saying? – Policy

Top words associated with policy:

	pay	guest	free	wife	membership	allow
1	paying	guests	gluten	pay	pay	guest
2	wife	pay	food	card	guest	allowed
3	food	card	options	diamond	year	food
4	guest	allow	better	traveling	diamond	wife
5	card	staff	guest	guest	food	card
6	year	wife	like	year	wife	family
7	without	membership	pay	amex	will	members
8	fee	food	choices	platinum	like	traveling
9	membership	charge	bar	member	member	amex
10	like	amex	please	membership	now	platinum

Notes:
- Happy Wife happy life.
- Paying comes up a lot, especially in conjunction with Guest and Wife.

Center for Statistics
and Analytical Services

What are people saying? – Products

Top words associated with products:

	food	choices	options	selection	variety	breakfast
1	better	food	food	food	food	food
2	choices	better	better	better	better	eggs
3	options	nice	free	selections	choices	options
4	good	like	like	good	like	choices
5	variety	good	gluten	beer	nice	items
6	selection	great	great	like	quality	better
7	like	variety	nice	nice	good	like
8	staff	soup	good	quality	offer	boiled
9	great	breakfast	breakfast	poor	options	hard
10	nice	new	salad	great	little	great

Notes:
- Most of the Product words have to do with Food.
- Variety and options are heavily associated with Food.
  - In addition you have both negative and positive word associations with the variety.
  - Potential future investigation based on Club and Tier

Center for Statistics
and Analytical Services

What are people saying? – Service

Top words associated with service:

	staff	bar	service	desk	bartender	friendly	front	wait
1	great	bartender	food	front	bar	staff	desk	waiting
2	food	food	staff	staff	food	helpful	staff	staff
3	always	staff	great	people	bartenders	always	food	bar
4	friendly	luxury	customer	food	staff	great	bar	food
5	best	service	bar	always	great	desk	people	people
6	helpful	like	like	time	time	food	always	time
7	desk	great	excellent	bar	service	front	friendly	minutes
8	excellent	time	time	friendly	like	good	great	flight
9	time	drink	good	great	drink	bar	helpful	line
10	bar	people	always	service	people	service	time	long

Notes:
• Positive word association with the Staff.
• We see waiting pop up for the first time.

What are people saying? – Top Terms

Top categorical terms by region, tier, and group:

	atl	east	west	midwest
facility	crowded	wifi	wifi	wifi
policy	pay	free	guest	guest
products	food	food	food	food
service	staff	staff	staff	staff

	tier 1	tier 2	tier 3
facility	wifi	wifi	crowded
policy	free	pay	guest
products	food	food	food
service	staff	staff	staff

	group 1	group 2	group 3
facility	crowded	wifi	wifi
policy	pay	pay	guest
products	food	food	food
service	staff	staff	staff

Top words by rating:

	0-1	2-3	4-5
1	wife	food	food
2	food	staff	great
3	staff	crowded	staff
4	pay	better	good
5	card	like	nice
6	guest	bar	like
7	people	people	better
8	time	time	always
9	left	small	new
10	told	need	wifi
11	experience	good	best
12	diamond	seating	time
13	sit	needs	bar
14	year	service	excellent
15	minutes	choices	choices
16	platinum	coffee	service
17	service	room	experience
18	even	space	visit
19	membership	wifi	people
20	will	poor	love

	0-1	2-3	4-5
facility	experience	crowded	wifi
policy	wife	pay	free
products	food	food	food
service	staff	staff	staff

Notes:
- Wife becomes prominent among low ratings.
- Crowded appears in ratings 2-3 but not 0-1.

Kennesaw State UNIVERSITY
Center for Statistics and Analytical Services

25

What are people saying? – Positive Words

Top terms associated with the most common positive adjectives:

	great	good	like	better	nice	always
1	staff	food	food	food	food	staff
2	food	staff	staff	like	staff	great
3	always	experience	great	selection	great	food
4	new	like	better	choices	new	friendly
5	experience	work	see	options	like	helpful
6	like	great	nice	good	really	good
7	good	always	new	quality	good	like
8	nice	nice	good	experience	time	nice
9	really	keep	really	wifi	bar	visit
10	service	better	time	staff	always	excellent

Kennesaw State UNIVERSITY
Center for Statistics and Analytical Services

26

What are people saying? – Negative Words

Top terms associated with the most common negative adjectives:

	rude	poor	disappointed	bad	terrible
1	staff	food	food	food	food
2	desk	service	pay	staff	like
3	people	selection	guest	experience	service
4	told	quality	wife	like	better
5	front	wifi	time	time	great
6	never	staff	platinum	bar	bar
7	food	poorly	card	good	please
8	service	better	year	really	people
9	time	people	membership	service	staff
10	experience	time	access	will	new

Center for Statistics and Analytical Services

What are people saying? – Top Subjects

Top terms associated with the most common subjects:

	food	staff	bar	time
1	better	great	bartender	food
2	choices	food	food	times
3	options	always	staff	staff
4	good	friendly	luxury	like
5	variety	best	service	people
6	selection	helpful	like	visit
7	like	desk	great	first
8	staff	excellent	time	nice
9	great	time	drink	bar
10	nice	bar	people	flight

Center for Statistics and Analytical Services

Summary

- On average, scores are lower in Group 1 and Tier 1.
- Food:
    - Most frequent term.
    - Lowest survey question scores.
- Crowded:
    - 12th most frequent in Group 1 and Tier 1.
    - 15th in Tier 3.
- Common Themes:
    - Food and population density
        - People is the 10th in Tier 1 and 11th in Tier 2, 11th in Group 1, 15th in Group 2 and 12th in Group 3.
    - Positive staff results.

Kennesaw State UNIVERSITY
Center for Statistics
and Analytical Services

Next Steps

- Phase I
    - Follow up on questions generated by project.

- Phase II
    - Full sentiment analysis of comments.
    - Collaboration with Computer Science Department for new text mining options.
    - Sponsorship of internships at Delta.

- Phase III or more…

Kennesaw State UNIVERSITY
Center for Statistics
and Analytical Services