Promoting responsible behavior to maintain cleanliness in Orchard Commons

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Research Report

Promoting responsible behavior to maintain cleanliness in Orchard Commons

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Executive summary

Orchard Commons is the newest UBC residence and learning space certified as a LEED Gold sustainable building. However, undisposed garbage and food waste has impeded the cleanliness of the space. A survey was conducted to learn about the demographics at Orchard Commons and implement the suitable intervention. Results found that 52% of the surveyed population are residents of Orchard Commons. Over 95% reported they recycle at least once a week and 96% agreed it was easy to find a recycling bin around the area. However, during the control week, 42 pieces of garbage were left undisposed in two classrooms. This research examined whether the implementation of a garbage and food-free learning zone promotes responsible stewardship by decreasing amount of undisposed garbage at public spaces. Signage with information that closely resembles a viewer's immediate social norm or setting is found to be effective in promoting responsible behavior (Goldstein et. al, 2008). Hence, viewer-tailored signage was created by eliciting provincial norms. Furthermore, viewers were encouraged to identify with the referenced group through complying with behaviors stated on the signage. After the implementation of viewer-tailored signage, undisposed garbage was reduced significantly in one of the two learning spaces.

Research question: Does targeting two learning zones in Orchard Commons and implementing viewer-tailored signage promote responsible stewardship by decreasing amount of undisposed garbage?

Hypothesis: The introduction of viewer-tailored signage within clear spatial boundaries will reduce number of undisposed garbage items in two learning zones in Orchard Commons.

Methods

Participants

We surveyed random patrons of the building to better understand the demographics of the participants and tailor-made our poster accordingly. These participants provided a sample of possible users of the two rooms. The survey was conducted inside and outside the rooms at random times during the week.

We found that with a total of 60 survey-takers, 52% (n=31) were male and 48% (n=29) were female. The majority of the participants (95%) were between 18 - 22 years old. 52% (n=31) participants live in Orchard Commons. 52% (n=31) participants visit Orchard Commons everyday, 22% (n=13) 4 -5 times a week, 20% (n=12) 2 - 3 times a week, and 7% (n=4) once a week. 42% (n=25) of participants visit Orchard Commons by choice, 23% (n=14) by obligation and 35% (n=21) both by choice and obligation.

Materials

The materials used were a Google document sheet shared between all the researchers. It included a table (appendix B) to record the number of amount of garbage left undisposed.

A survey (appendix D) designed by the researchers was also used during the control

and experimental weeks. The survey was created and collected through Qualtric. The survey contained questions such as “My friends recycle on a regular basis”, ‘My family recycles on a regular basis’, “In your opinion how important is recycling?”, ‘How often do you recycle?’ as well as ‘To what extent do you feel a sense of belonging in this space?’ (the complete survey can be found in the appendix). These questions asked to understand about the participant’s attitudes towards recycling and proper garbage disposal.

Finally, a poster was designed (appendix A) and was put up at the entrance of two rooms. The poster was designed by the researchers, inspired by previous research on norms that match the individual’s context, called provincial norms (Goldstein et. al, 2008, Deshpande et, al, 1986) (the poster can be found in the appendix).

Conditions and Procedure

This study is an experimental study with a control condition and an experimental condition. The control condition was held on the week of March 22th- 24th 2017 which were business days. Weekends were not measured. The control week involved three garbage counts per day. Each piece of garbage left behind: such as bottles, food scraps and wrappers, and any item that was left behind were counted as garbage. The times of the day were 10am, 12pm and 6pm. The amount of garbage was recorded individually for each room. The researchers also approached people who were currently using the rooms and asked if they could complete the survey.

The experimental condition was held on the week of March 29th-31st 2017. During this time the researchers put up the poster at the entrance of both rooms, 1001 and 3018 on Tuesday the 28th, that way it allowed for students to see the poster before the counting started on Wednesday the 29th. During this week, like the control week, researchers would go into the rooms three times a day: 10am, 12pm and 6pm.

Variables

This study is an experimental study where three variables were measured. The **independent variable** was the poster, which is our intervention. Since the client's objective was to instill responsible behavior in users of this space the researchers designed a poster that touched on self identification cues. It said: ‘Did you know?’ in bolded letters to call the attention of the students in the room. And beneath it said ‘This is a NO food zone. Most people who used this room over the past week did not bring in any food and recycled their waste’. Beneath that a meme was placed which said ‘Come on! You can recycle that!’ with the picture of a character from the movie Star Trek. With these variable we touched on our two main objectives which were for users of the space to not bring food into the rooms and for them to properly dispose their waste such as bottles, papers, etc. Although we did not oversee whether participants were correctly disposing their garbage we chose the word ‘recycle’ instead of ‘throw garbage’ because there is no harm in reminding students to take care of the environment even though it was not the focus of our intervention.

The **dependent variable** was the amount of undisposed garbage inside the learning zones, which was counted by the researchers three times a day during both the control and experimental week. Each piece of item that should not be in the room was counted in as one. For example: bottle, plate, paper, food wrapper, spoon, tray are counted as one garbage. No piece of garbage was counted twice as cleaning staff was coming in between measures to clean the rooms.

The **control variable** was the rooms we counted (1001 and 3038), the days of the week (Wednesday, Thursday, Friday), times of the day (10am, 12pm and 6pm) and counting methods (each piece of garbage in the room) – these variables remained constant for both the experimental and control conditions.

T-Test

[DataSet2]

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	control_1001	4.6667	9	5.40833	1.80278
	experimental_1001	2.0000	9	3.04138	1.01379
Pair 2	control_3038	3.5556	9	1.01379	.33793
	experimental_3038	.3333	9	.70711	.23570

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	control_1001 & experimental_1001	9	-.091	.816
Pair 2	control_3038 & experimental_3038	9	.407	.277

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	control_1001 - experimental_1001	2.66667	6.44205	2.14735	-2.28513	7.61846	1.242	8	.249
Pair 2	control_3038 - experimental_3038	3.22222	.97183	.32394	2.47521	3.96923	9.947	8	.000

Results

Our null hypotheses were that there would no effect between the two conditions in room 1001 (H_0: $\mu_1 = \mu_2$) and room 3038 (H_0: $\mu_3 = \mu_4$) with a two-tailed test with alpha level set to .05, (α_2 = .05). The results showed that there was no significant difference in room 1001 in Orchard Commons, $t(8)$= 1.24, p=.249467, which is below the critical t value, $t(8)$=2.306. Therefore the first null hypothesis is retained. As for room 3038 in Orchard Commons, there was a significant difference, $t(8)$= 9.95, p<.001 which was above the critical t, therefore the second null hypothesis is rejected.

The results show that there was no significant difference between the two weeks (baseline and experimental week at each time) in room 1001. Room 1001 is a lecture space in Orchard Commons and is used by students in both UBC and Vantage College, the space is very clean most of the time except when there are events. We chose this zone because it represented one of the two types of learning spaces in Orchard and it was recommended by the client.

As for room 3038, there was a significant decrease in the amount of undisposed garbage in the classrooms with the introduction of the poster. We chose this room because it is representative of the other kind of learning zone in Orchard and it was also recommended by the client.

During the control week, a total of 42 pieces of garbage were found at Room 1001 and 32 pieces of garbage were found in Room 3018. During the experimental week when the intervention was implemented, 18 pieces of garbage were found at Room 1001 and 3 pieces of garbage in Room 3018.

Summary of survey (appendix E)

Sense of belonging and rate of cleanliness: Over half of the participants 58% (n=35) reported a moderate sense of belonging in the space, whilst 33% (n=20) reported a high level of belonging and 8% (n=5) reported a low level. The majority of participants rated Orchard Commons as 'very clean' 48% (n=29) or 'clean' 43% (n=26), whilst 8% (n=5) rated the cleanness as 'so-so'. None of the participants rated the space as 'not clean' or 'dirty'.

Recycling habits: Over half of the population 52% (n=31) recycle on a daily basis whereas 28% of the participants (n=17) recycle every 2- 3 days. 13% of the participants (n=8) recycle every 4 - 5 days, 3% (n=2) recycle every 6 -7 days and 3% (n=2) recycle less than once a week. On average, most participants either 'strongly agree' 28% (n=17) or 'agree' 58% (n=35) that it is easy to distinguish between items for recycling and general waste. Whereas 12% of the participants (n=7) answered 'neutral', and 2% (n=1) 'disagreed'.

Positive modeling and attitude towards proper garbage disposal: Over half of the population (n=34) agreed that most of their friends recycle on a regular basis, whilst 5% of the participant 'strongly agree', 32% (n=19) were 'neutral', and 7% (n=4) disagreed. When asked 'my parents recycle on a regular basis', 22% of the participants (n=13) 'strongly agreed, 33% (n=22) 'agreed', 20 (n=12) were 'neutral', 17% (n=10) disagreed, and 8% (n=5) 'strongly disagreed'. 53% (n=32) 'strongly agree' that it is easy to find a recycling bin around the area, 43% (n=26) 'agree', 3% (n=2) were 'neutral', and none selected 'disagree' or 'strongly disagree'. A vast majority of participants 72% (n=43) selected 'I should always recycle' when asked how important is recycling. 28% (n=17) selected 'I should recycle whenever possible and convenient'. None selected that 'It's not important whether I recycle or not as long as I clean up after myself' or 'It's not important if I do recycle, it's someone's job to clean up and maintain the cleanness of my environment'.

Discussion & recommendations

A survey was conducted to better understand the demographics as well as the attitudes and norms of patrons of Orchard Commons and implement a tailored intervention according. After surveying 60 participants we had two major findings; (1) participants are mostly 18-22 year old students that reside elsewhere and (2) most participants have positive views (thoughts and feelings) about correct garbage disposal. On the other hand, our observations as well as the clients' observations showed us that although the participants have positive thoughts and feelings about garbage disposal, they do not behave accordingly. Based on Cognitive Behavior Theory as it pertains to the environment (Cialdini et al., 1991), thoughts and feelings influence behaviors in a transactional model. So why are participants not recycling?

Possible limitations of the timing of the study arise here; the implementation occurred during the second half of the second term. The end of the year means that the students and residents already have a very established habit and preconceived notion of how to use the learning spaces, for example eating dinner in the learning spaces were second nature to them. We talked to some of the students during our first visit to the building and found that most students don't realize that eating is not allowed inside the classrooms. Secondly, we collected most of our data during a stressful time of the year for students (when most papers are due and finals are approaching), research shows that cortisol responses and egoistic decision-making are highly correlated (Starcke et al., 2011).

Our intervention drew from the findings of the survey and aimed to create an eye-catching, viewer-tailored poster that elicited provincial norms in order to promote the targeted behavior (garbage disposal). We measured amount of garbage disposal three times a day for three days to establish the baseline condition and found that students left 74 pieces of garbage at the two rooms (no piece of garbage was counted twice as cleaning staff were coming in between measures). We then posted our intervention and went in during week 2 to measure 3 times for three days. We did a two tailed t-test (we matched the exact day and time of week one with the day and time in week two to control for extraneous/confounding factors) and found a significant decrease in amount of garbage in room 3038, $t(8)= 9.95$, $p<.001$, but not room 1001, $t(8)= 1.24$, $p=.249467$.

We targeted these two zones in our intervention because they capture the two "types" of learning spaces in Orchard Commons; (1) multimedia room suitable for private study and (2) classroom. "Zones" were operationalized as contained learning spaces (with a door) that were easy to test and pilot our intervention on.

The reason the intervention (tailored poster) was very effective in decreasing amount of undisposed garbage in one of the two environments (room 3038) is possibly due to the fact that that room had a higher average garbage count during the first week and there was more room for change. In addition, students might not have had clear conceptualization of the rules that apply to that room; it's a multimedia room and perhaps students did not have a behavioral paradigm that dictates how to use that type of room; whether that means perceiving it as food friendly or informal.

From our findings, we presented the client with three possible solutions to the problem. Firstly, adding large recycling bins instead of smaller version which were at Orchard Commons at the time of our observation (Appendix E), one of the observations was that the garbage bins were always full so that could enhance the cleanliness.

Secondly, to create a clear spatial boundary around the cafeteria. Because Orchard has an open space that connects the cafeteria to the learning spaces with no clear boundaries, students often carry their cups and plates to study while having dinner. Floor signage or different colour schemes could be used to highlight the boundaries and the no-food zones (Appendix F).

Finally, to ensure that students' behaviors match their thoughts and feelings regarding garbage disposal, using the Group Leader Approach (Hopper et al., 1991) could be extremely beneficial as it is proven to change behaviors but not underlying norms and attitudes. This approach aims to elect a group of people (students in this case) to properly dispose their garbage and not eat inside classroom (engage in positive behavior) and lead by example. This approach utilizes positive modeling and cements new provincial norms for Orchard Commons and could be very effective.

The client was very responsive to our recommendations, bigger garbage bins have already been added to Orchard Commons, he also confirmed our survey findings are consistent with his personal observations. We are optimistic that our findings can pave the way for future interventions that encompass more than just two zones. If the client or others wish to implement future studies on problematic learning spaces, we think that doing the study during a different time of the year could be more informative of "normal/baseline behavior". Secondly, a longer study could account for the fact that the effect possibly needs more time to change behavior; students might not have noticed the poster in those three days and the changes might have not carried over yet.

Appendix A

Appendix B

Control week (pieces of garbage undisposed)

Room 1001	Wednesday	Thursday	Friday
Morning (10am)	15	4	10
Afternoon (1pm)	2	0	2
Evening (6pm)	0	9	0
Total	17	13	12

Total: 42

Room 3018	Wednesday	Thursday	Friday
Morning (10am)	5	3	4
Afternoon (1pm)	4	2	3
Evening (6pm)	5	3	3
Total	14	8	10

Total: 32

Experimental week (pieces of garbage undisposed)

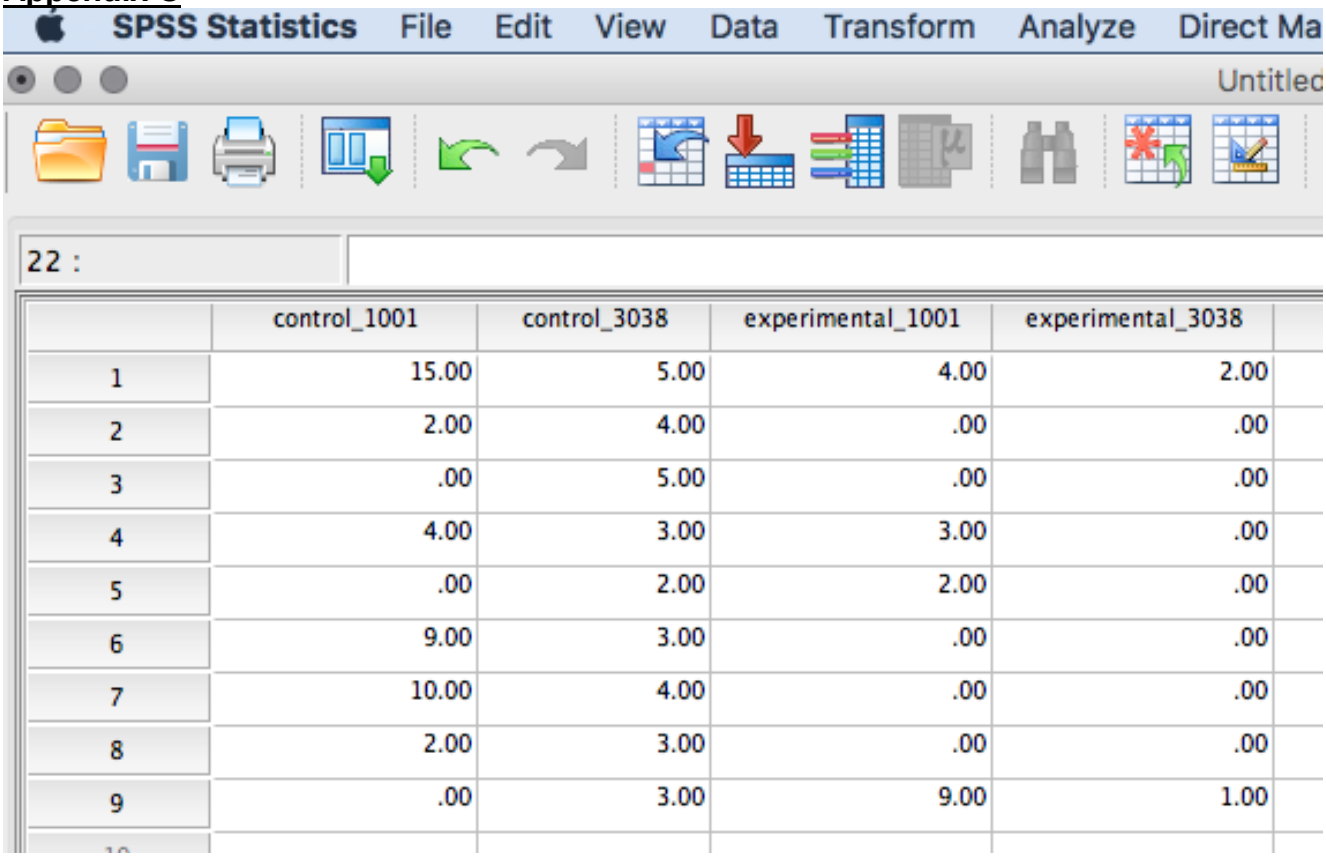
Room 1001	Wednesday	Thursday	Friday
Morning (10am)	4	3	0
Afternoon (1pm)	0	2	0
Evening (6pm)	0	0	9
Total	4	5	9

Total: 18

Room 3018	Wednesday	Thursday	Friday
Morning (10am)	2	0	0
Afternoon (1pm)	0	0	0
Evening (6pm)	0	0	1
Total	2	0	1

Total: 3

Appendix C



	control_1001	control_3038	experimental_1001	experimental_3038
1	15.00	5.00	4.00	2.00
2	2.00	4.00	.00	.00
3	.00	5.00	.00	.00
4	4.00	3.00	3.00	.00
5	.00	2.00	2.00	.00
6	9.00	3.00	.00	.00
7	10.00	4.00	.00	.00
8	2.00	3.00	.00	.00
9	.00	3.00	9.00	1.00

Appendix D

Link to the survey: https://ubcarts.co1.qualtrics.com/jfe/form/SV_daFsu2xwl1tcifb

Survey:

Q1 Please select your gender (optional)

- ❍ Male
- ❍ Female
- ❍ Others (please specify)

  _____

Q2 Please select your age group

- ❍ Under 18 years old
- ❍ 18 - 22 years old
- ❍ 23 - 27 years old
- ❍ 28 - 32 years old
- ❍ Over 33 years old

Q3 Do you live in Orchard Commons?

- ❍ Yes
- ❍ No

Q4 How frequently do you visit this space per week?

- ❍ Everyday
- ❍ 4 - 5 times a week
- ❍ 2 - 3 times a week
- ❍ Once a week
- ❍ Others (please specify)

  _____

Q5 When you visit this space, is it by choice or by obligation?

- ❍ By choice
- ❍ By obligation
- ❍ Both of the above

Q6 To what extent do you feel a sense of belonging in this space?

- ❍ A great deal
- ❍ Somewhat
- ❍ Not at all

Q7 How would you rate the cleanliness at Orchard Commons?

- ❍ Very clean
- ❍ Clean
- ❍ So-so
- ❍ Not clean
- ❍ Dirty

Q8 How often do you recycle?

- ❍ Everyday
- ❍ Every 2 - 3 days
- ❍ Every 4 -5 days
- ❍ Every 6 - 7 days
- ❍ Less than once a week

Q9 I find it easy to distinguish between items for recycling and general waste

- ❍ Strongly agree
- ❍ Agree
- ❍ Neutral
- ❍ Disagree
- ❍ Strongly disagree

Q10 Most of my friends recycle on a regular basis

- ❍ Strongly agree
- ❍ Agree
- ❍ Neutral
- ❍ Disagree
- ❍ Strongly disagree

Q11 My parents recycle on a regular basis

- ❍ Strongly agree
- ❍ Agree
- ❍ Neutral
- ❍ Disagree
- ❍ Strongly disagree

Q12 I can easily find a recycling bin around this area

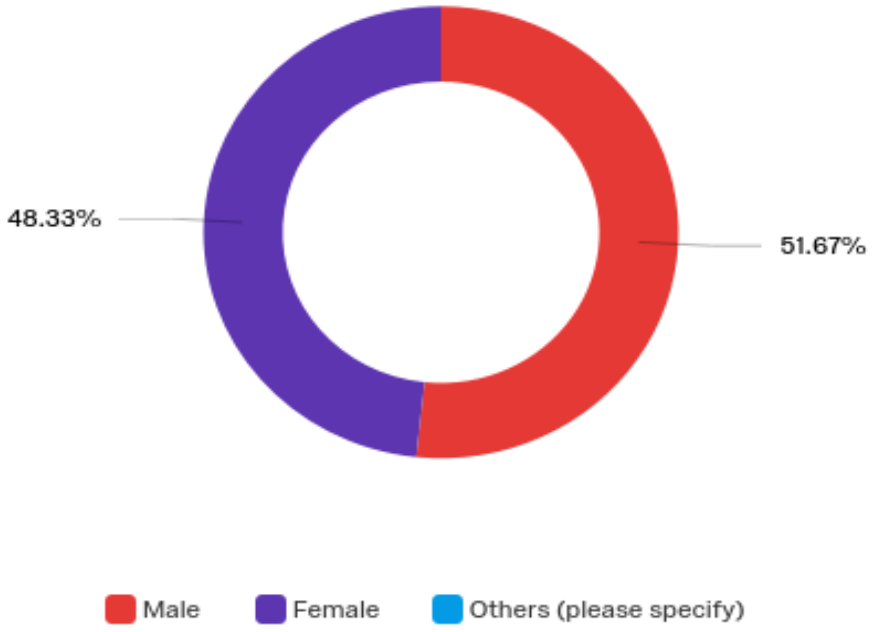
- ❍ Strongly agree
- ❍ Agree
- ❍ Neutral
- ❍ Disagree
- ❍ Strongly disagree

Q13 In your opinion, how important is recycling?

- ❍ I should always recycle
- ❍ I should try to recycle whenever possible and convenient.
- ❍ It's not important whether I recycle or not as long as I clean up after myself.
- ❍ It's not important if I do recycle, it's someone's job to clean up and maintain the cleanliness of my environment

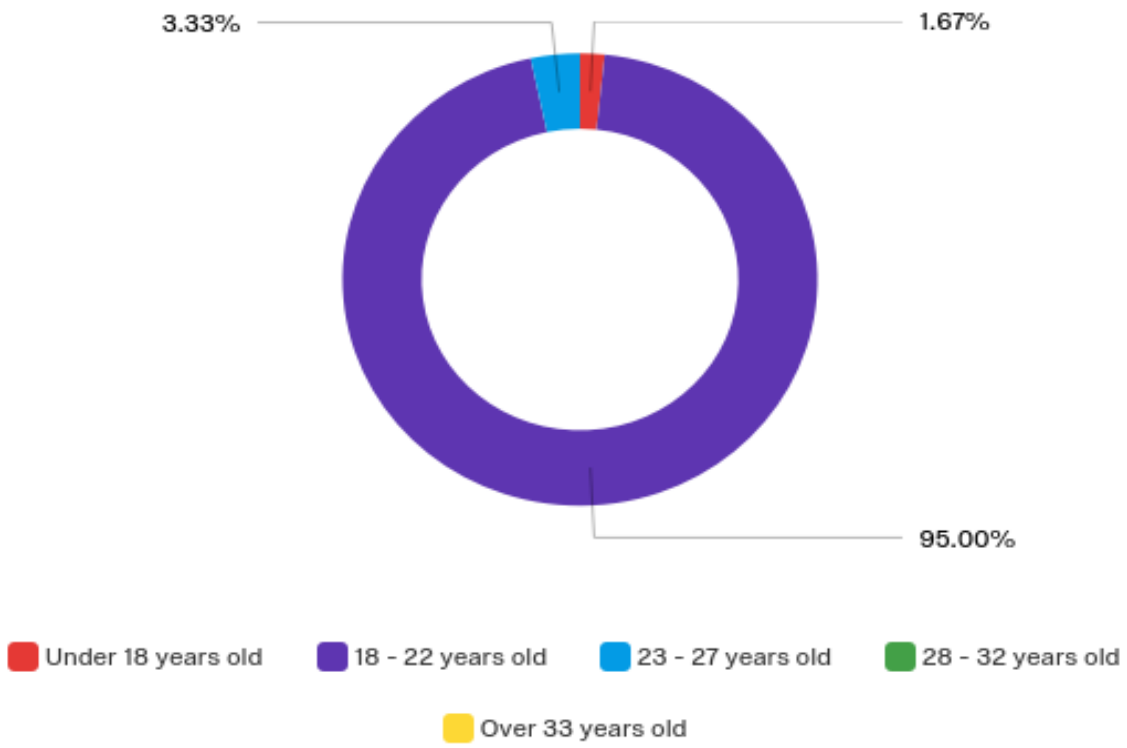
Appendix E (pg. 9 – pg. 21)

Q1 - Please select your gender (optional)



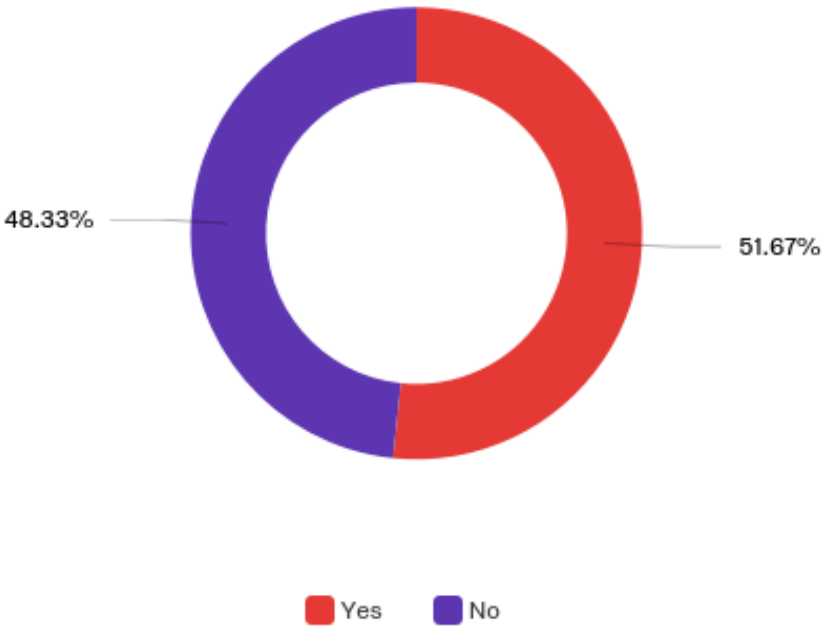
#	Answer	%	Count
1	Male	51.67%	31
2	Female	48.33%	29
3	Others (please specify)	0.00%	0
	Total	100%	60

Q2 - Please select your age group



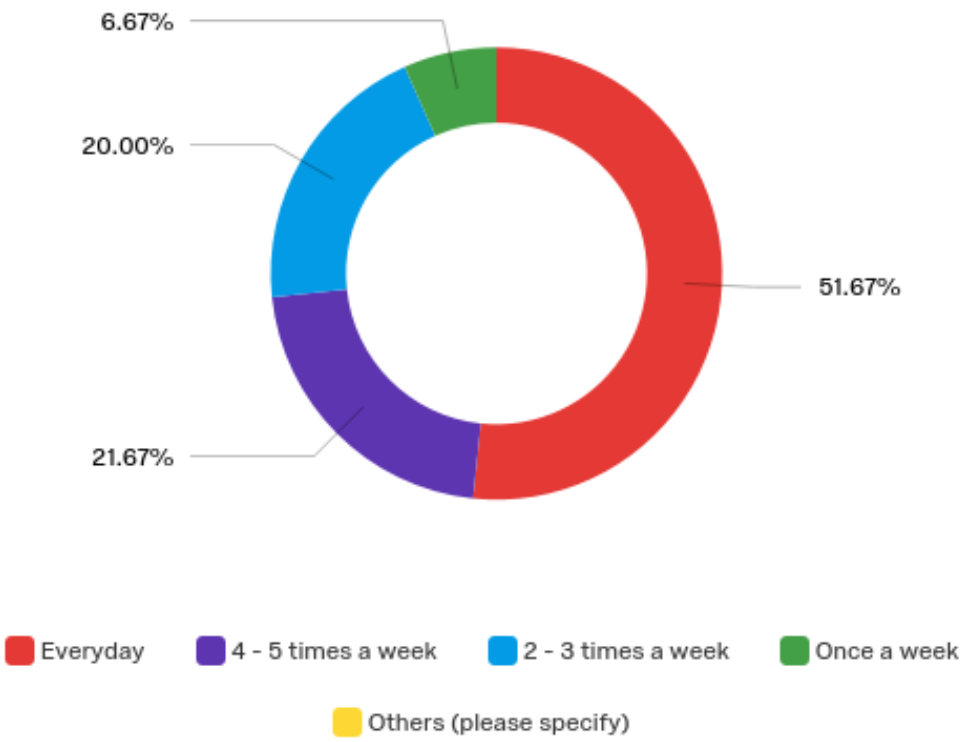
#	Answer	%	Count
1	Under 18 years old	1.67%	1
2	18 - 22 years old	95.00%	57
3	23 - 27 years old	3.33%	2
4	28 - 32 years old	0.00%	0
5	Over 33 years old	0.00%	0
	Total	100%	60

Q3 - Do you live in Orchard Commons?



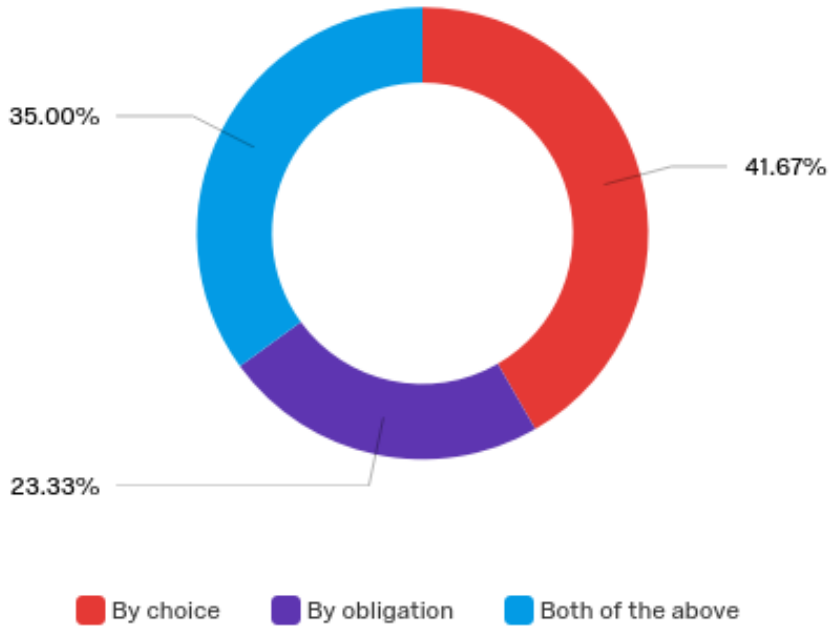
#	Answer	%	Count
1	Yes	51.67%	31
2	No	48.33%	29
	Total	100%	60

Q4 - How frequently do you visit this space per week?



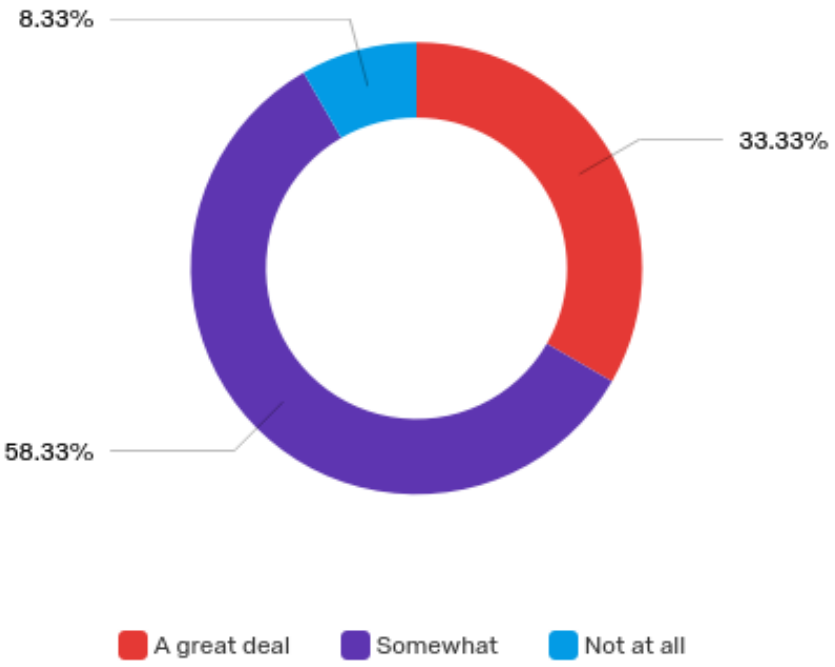
#	Answer	%	Count
1	Everyday	51.67%	31
2	4 - 5 times a week	21.67%	13
3	2 - 3 times a week	20.00%	12
4	Once a week	6.67%	4
5	Others (please specify)	0.00%	0
	Total	100%	60

Q5 - When you visit this space, is it by choice or by obligation?



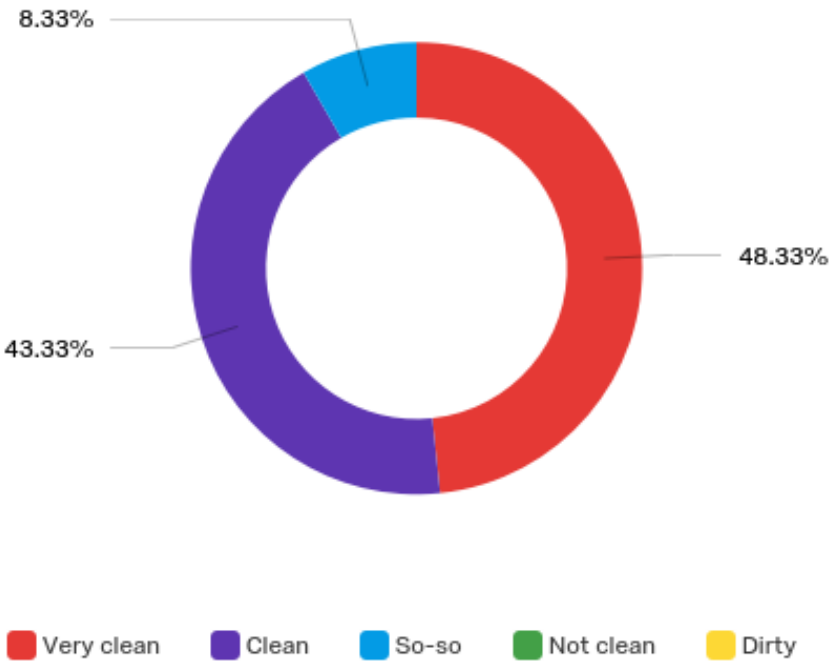
#	Answer	%	Count
1	By choice	41.67%	25
2	By obligation	23.33%	14
3	Both of the above	35.00%	21
	Total	100%	60

Q6 - To what extent do you feel a sense of belonging in this space?



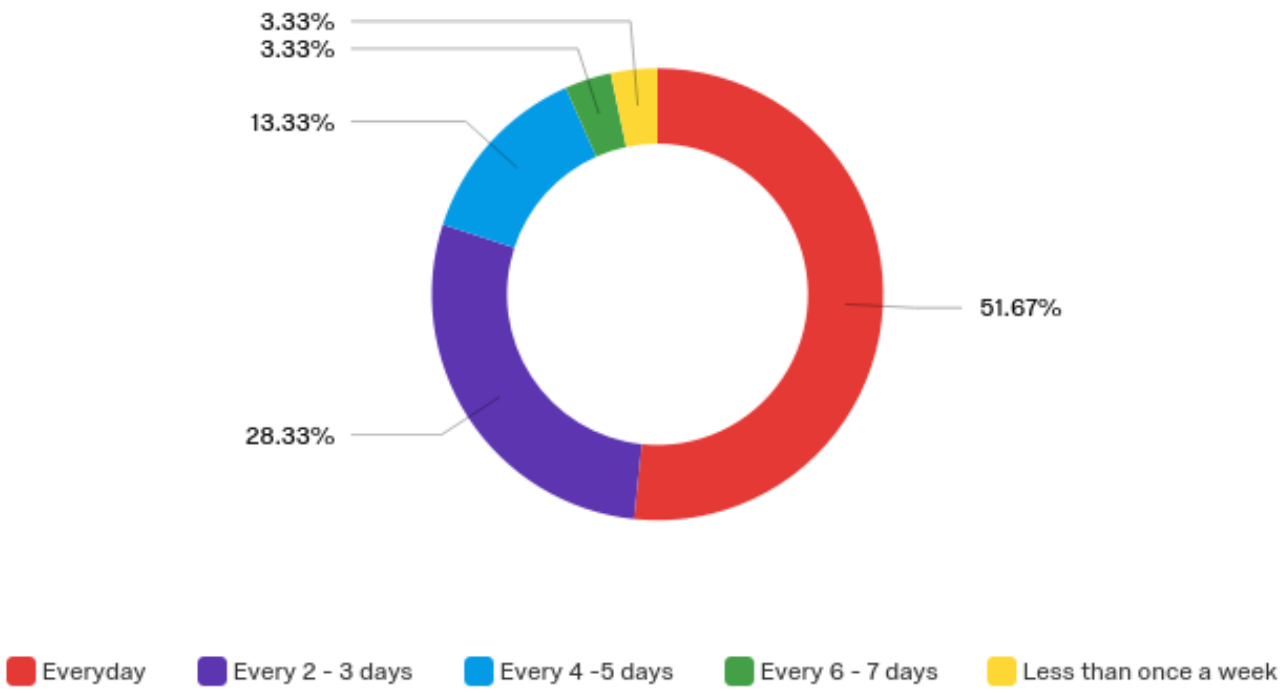
#	Answer	%	Count
1	A great deal	33.33%	20
2	Somewhat	58.33%	35
3	Not at all	8.33%	5
	Total	100%	60

Q7 - How would you rate the cleanliness at Orchard Commons?



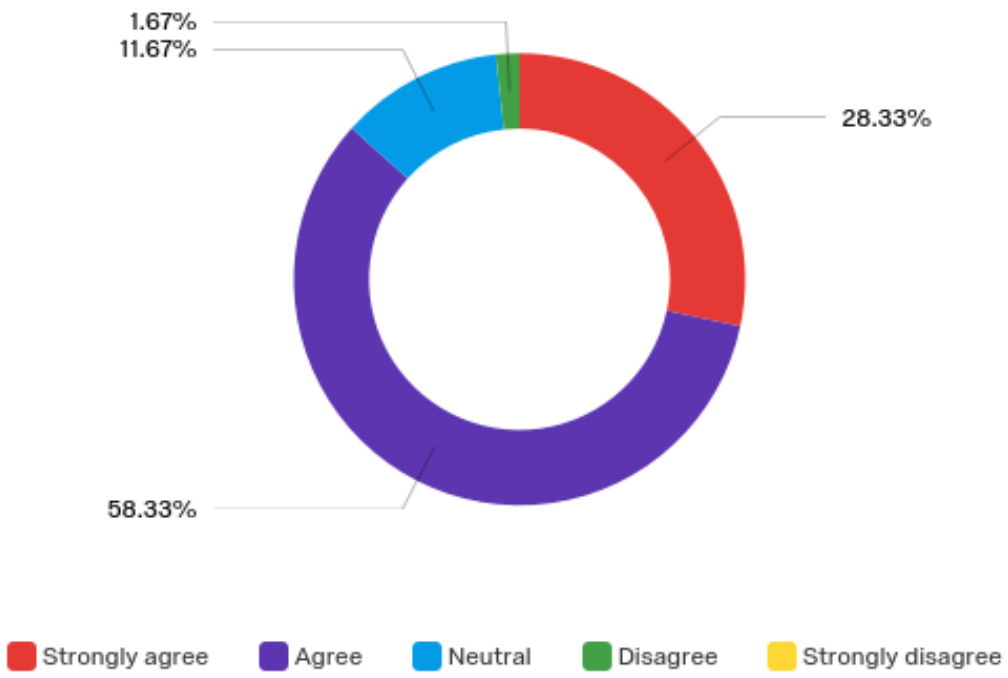
#	Answer	%	Count
1	Very clean	48.33%	29
2	Clean	43.33%	26
3	So-so	8.33%	5
4	Not clean	0.00%	0
5	Dirty	0.00%	0
	Total	100%	60

Q8 - How often do you recycle?



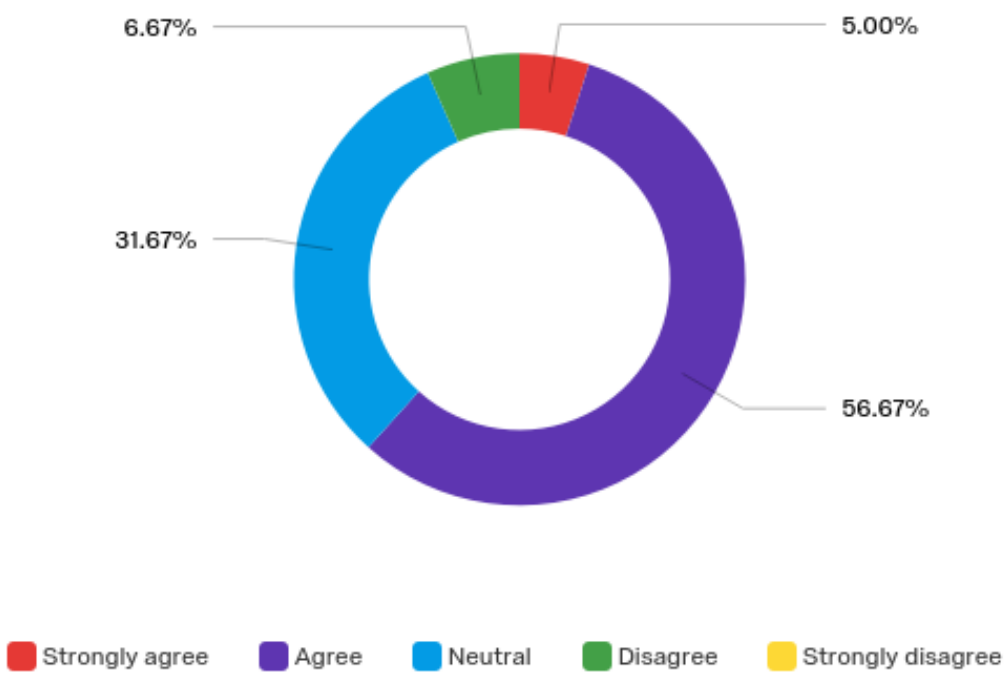
#	Answer	%	Count
1	Everyday	51.67%	31
2	Every 2 - 3 days	28.33%	17
3	Every 4 -5 days	13.33%	8
4	Every 6 - 7 days	3.33%	2
5	Less than once a week	3.33%	2
	Total	100%	60

Q9 - I find it easy to distinguish between items for recycling and general waste



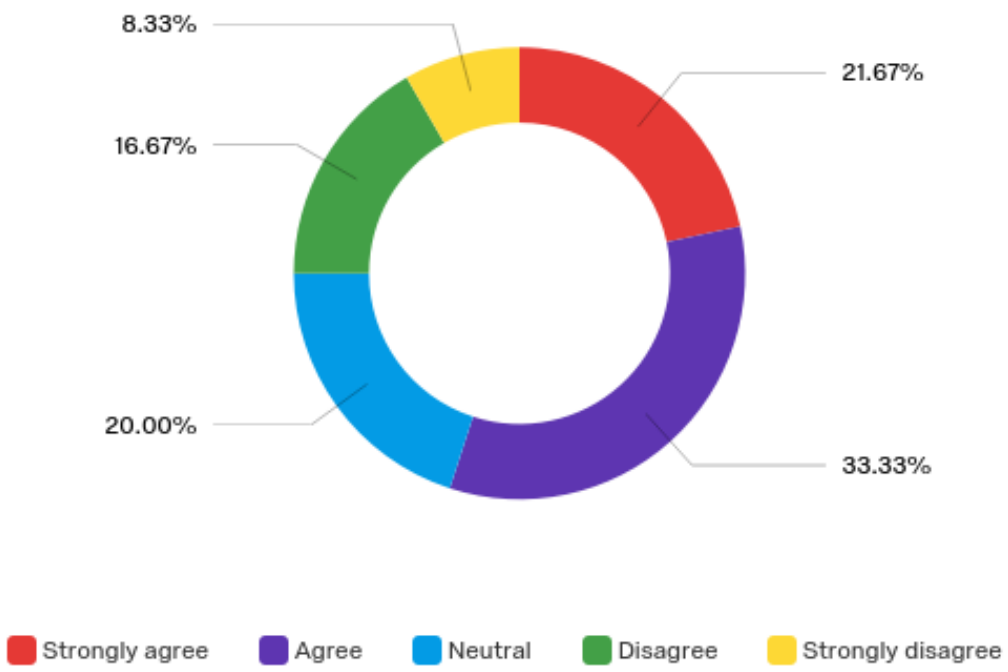
#	Answer	%	Count
1	Strongly agree	28.33%	17
2	Agree	58.33%	35
3	Neutral	11.67%	7
4	Disagree	1.67%	1
5	Strongly disagree	0.00%	0
	Total	100%	60

Q10 - Most of my friends recycle on a regular basis



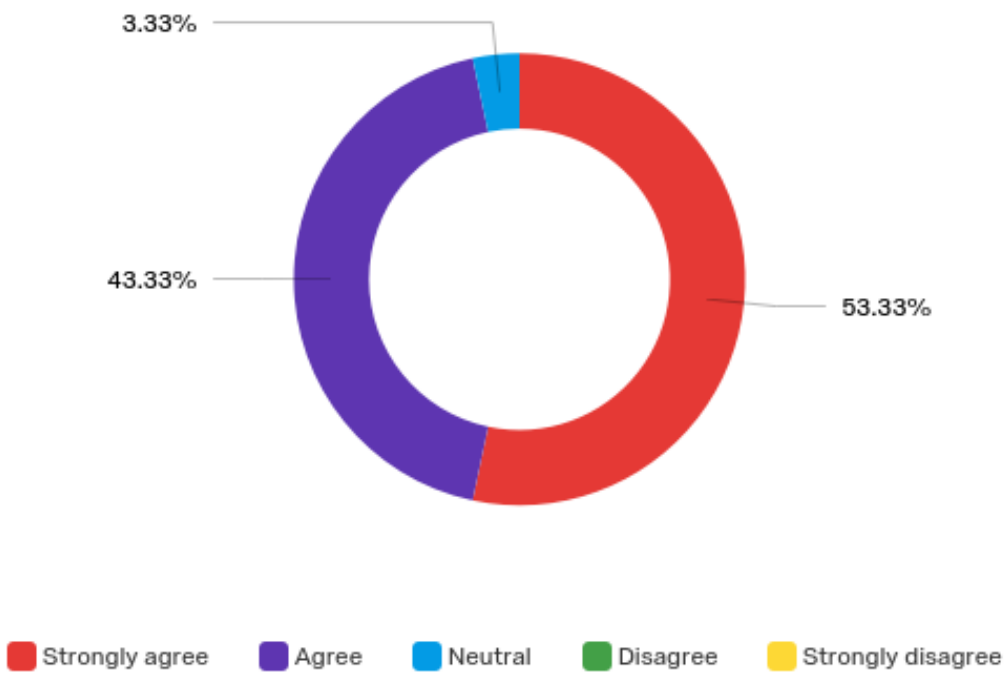
#	Answer	%	Count
1	Strongly agree	5.00%	3
2	Agree	56.67%	34
3	Neutral	31.67%	19
4	Disagree	6.67%	4
5	Strongly disagree	0.00%	0
	Total	100%	60

Q11 - My parents recycle on a regular basis



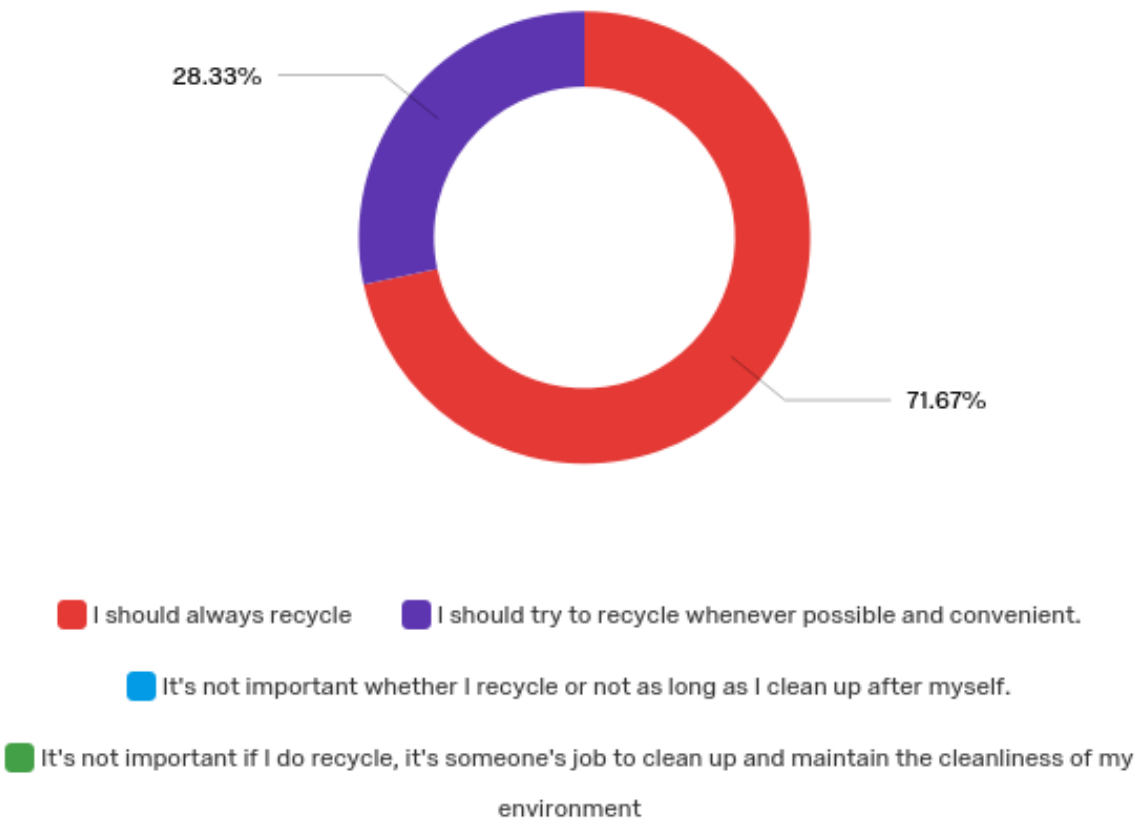
#	Answer	%	Count
1	Strongly agree	21.67%	13
2	Agree	33.33%	20
3	Neutral	20.00%	12
4	Disagree	16.67%	10
5	Strongly disagree	8.33%	5
	Total	100%	60

Q12 - I can easily find a recycling bin around this area



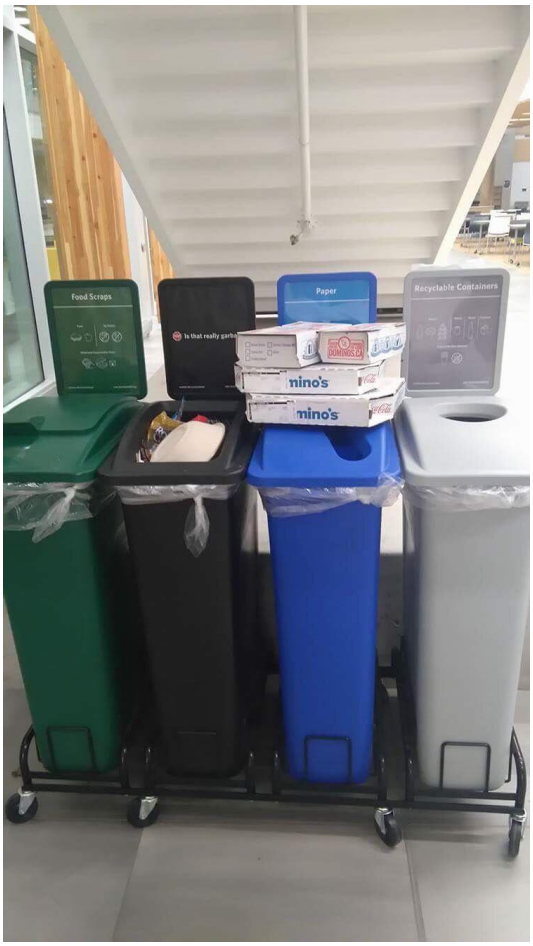
#	Answer	%	Count
1	Strongly agree	53.33%	32
2	Agree	43.33%	26
3	Neutral	3.33%	2
4	Disagree	0.00%	0
5	Strongly disagree	0.00%	0
	Total	100%	60

Q13 - In your opinion, how important is recycling?



#	Answer	%	Count
1	I should always recycle	71.67%	43
2	I should try to recycle whenever possible and convenient.	28.33%	17
3	It's not important whether I recycle or not as long as I clean up after myself.	0.00%	0
4	It's not important if I do recycle, it's someone's job to clean up and maintain the cleanliness of my environment	0.00%	0
	Total	100%	60

Appendix F



Appendix G

References:

Cialdini, R. B., Kallgren, C. A., & Reno, R. R. (1991). A Focus Theory of Normative Conduct: A Theoretical Refinement and Reevaluation of the Role of Norms in Human Behavior. *Advances in Experimental Social Psychology Advances in Experimental Social Psychology Volume 24*, 201-234. doi:10.1016/s0065-2601(08)60330-5

Deshpande, Rohit, Wayne D. Hoyer, and Naveen Donthu (1986), "The Intensity of Ethnic Affiliation: A Study of the Sociology of Hispanic Consumption," *Journal of Consumer Research, 13* (2), 214–20.

Goldstein, N., Cialdini, R., & Griskevicius, V. (2008). A room with a viewpoint: Using social norms to motivate environmental conservation in hotels. *Journal of Consumer Research, 35*(3), 472-482. doi:10.1086/586910

Hopper, J. R., & Nielsen, J. M. (1991). Recycling as Altruistic Behavior: Normative and Behavioral Strategies to Expand Participation in a Community Recycling Program. *Environment and Behavior, 23*(2), 195-220. doi:10.1177/0013916591232004

Starcke, K., Polzer, C., Wolf, O. T., & Brand, M. (2011). Does stress alter everyday moral decision-making? *Psychoneuroendocrinology, 3 6*(2), 210-219. doi:10.1016/j.psyneuen.2010.07.010

Delays and difficulties:

At the beginning, this experiment aimed to implement the 'garbage-free-zone' by creating a visual boundary by placing a line on the floor of the classrooms to show that they are entering a 'no-garbage-zone'. Our goal was to place both physical and digital signage (with audio-visual effects) around Orchard Commons. This will allow a greater number of students to become aware of the newly implemented 'garbage-free' campaign and to remind students that food is not allowed within the classroom. However, due to the lengthy approval process required by the UBC Housing administration for digital signage to be displayed, in the end, only the physical poster was put up during the experimental week.

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