

36-303A: Survey, Sampling, and Society
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**Survey on CMU Undergraduates’
Satisfaction with and Use of UC
Athletic Facilities**

Drafty Draft

Section 1: Introduction

Research Question and Motivation

We intend to complete a survey of the Carnegie Mellon University (CMU) undergraduate population's use of and satisfaction with the University Center (UC) athletic facilities. The athletic facilities are located in the UC and are often seen as a central gathering place for the entire university. The athletic facilities provide a venue for recreation and physical activity for all members of the university who possess a valid CMU ID card. We live in a time where healthy living and exercise are valued, and it will be useful to find out how satisfied CMU students are with the athletic facilities in the UC. As members of the CMU undergraduate population, we would like to know how people view these facilities, and potentially take action to improve them.

There are several questions that we would like to study to identify the use and satisfaction of the UC athletic facilities. We first want to ask questions about how frequently all of the UC athletic facilities are used. This will tell us which students utilize the athletic facilities based on specific demographic characteristics. As a result, we will know which facilities are the highest utilized ones, and identify any problems dealing with over-crowdedness on these facilities. Additionally, we want to ask questions regarding the cleanliness of facilities. Answers may tell us that the UC staff needs to focus more on cleaning the weights and equipment to make users more satisfied. After that, we want to ask respondents about the effectiveness of equipment in these facilities. By asking these questions, we will be able to identify problems with equipment and eventually improve those problems by replacing them or including more detailed instructions. We would also like to ask whether the respondents believe that check-in process and locker rooms are effective. Answers will enable us to determine the types of improvements we can make with regards to these items. We will conclude our survey by asking open-ended questions about any improvements that respondents would like to see implemented. We will also ask an open-ended question about aspects of the athletic facilities that they are satisfied with.

These questions will serve a general purpose, whether CMU students are satisfied with the UC athletic facilities and how these facilities can be improved. By identifying potential problems, we will have the potential to increase the satisfaction level of students and effectiveness of the facilities. Doing so will eventually optimize facility use and satisfaction.

Citations to Literature on the Topic

After research, it seems as though no surveys have been completed on the overall satisfaction and use of all UC athletic facilities. This presents us with a great opportunity to explore our topic, free from bias created from prior studies.

Based on research on the Carnegie Mellon University webpage, we found the following information that will enhance our study:

- 1) The first floor of the Center features a gymnasium for basketball, volleyball, and badminton, as well as two racquetball courts, two convertible racquetball/squash courts, an eight-lane, 25-yard swimming pool and a diving pool. The second floor features the fitness and exercise rooms with a Cybex weight training circuit, stationary bikes, rowers, steppers, elliptical machines, and treadmills, as well as one squash court and an activity room for aerobics classes (<http://www.cmu.edu/university-center/fitness/index.html>).
- 2) Hours of operations are Monday-Friday from 6:00 AM-2:00 AM, and Saturday and Sunday from 9:00AM-2:00AM (<http://www.cmu.edu/athletics/facilities/uc.html>).
- 3) Members of the University community have the opportunity to request athletic facilities for approved events (<http://www.cmu.edu/athletics/facilities/reservations.html>).
- 4) Holders of valid Carnegie Mellon Identification Cards may escort one guest into athletic facilities in the University Center (<http://www.cmu.edu/athletics/facilities/uc.html>).

5) Availability of each facility:

Weight/Cardio Room:

Cybex Weight Training Circuit
Stationary Bikes
Rowers
Ski Machines
Steppers
Treadmills

Wiegand Gym:

2 basketball courts
3 volleyball courts
1 badminton court

Recreational Swimming:

Monday - Friday
7-8 am, 11:30 am-1:30 pm,
7-9 pm
Saturday & Sunday
1:00 pm - 4:00 pm

Activities Room:

Group X-ercise classes held here

Stability Balls
Steps
Indoor Cycling
Yoga / Pilates Mats
Kick Boxing

Racquetball & Squash

Two Racquetball
One Squash
Two Convertible Courts

Whirlpool & Steam Rooms

Monday through Friday
6:00 AM-2:00 AM
Saturday & Sunday
10:00 AM-2:00 AM

(<http://www.cmu.edu/athletics/facilities/uc.html>)

Much can be learned from the survey results, especially because there was no valid research on this topic before. Not only will we see if operation of the UC athletic facilities satisfy the preferences of CMU undergraduate students, but also we will learn about specific details that can be acted upon and make the UC athletic facilities better. We will take all of our research, which is mostly presented on the UC webpage, and incorporate them into our survey. Our research presents data on operations, availability of equipment, and equipment regarding each facility in the UC.

Quick Summary of Results from Section 4

We will summarize all of our results after compiling our statistical analyses and completing our overall analysis of our results. We will emphasize the key items that we learn from doing this survey from start to finish, as well as the most important data that we acquired from the results of the survey.

Section 2: Methods

Target Population

Our target population includes all CMU undergraduate students who utilize the UC athletic facilities. Specifically, since we want to improve the UC athletic facilities, the majority of our sample should include students who actually use the UC athletic facilities on a regular or occasional basis, which does not include the other athletic facilities on campus.

In order to make conclusions about our target population, we will have to obtain a representative sample from all of CMU's undergraduate students.

Sampling Frame

Our primary sampling frame is all of the students listed in the Carnegie Mellon C-book, an undergraduate student email directory. We understand that the C-book does not contain all CMU undergraduates, so some non-sampling error may be present. We will use the sampling frame to obtain a representative sample by assigning each undergrad student listed in the C-book a number, and picking our sample through a random number process. To get an equal representation from each undergraduate class year, we will execute the random number process four times (one for each year). This will be done through a random number generator, giving each student listed in the C-book an equal chance of being selected. Since we are only interested in undergraduates who use the UC athletic facilities, our sample will have to be relatively large to make up for those students chosen that do not use the UC athletic facilities. The students that are chosen by the random number generator will then be sent an email, briefly explaining our intent and including a link to an online survey

through QuestionPro.com.

Sample Design/Methods

The sampling scheme that our group has decided on is a simple random sample without replacement. A simple random sample with replacement would not be useful to us because we do not want to double count people's responses as it would skew our data. This means that once a respondent has been randomly selected to participate in our survey, they will not have a chance of being selected again.

We considered doing a stratified random sample; however, we realized that we would not gain any useful information by stratifying our sample. We first considered stratifying our sample by class year. We then realized that knowing how the freshmen utilize the gym in comparison to the seniors does not benefit our insight of the UC gym facilities. We are more focused on those who actually attend the gym on a regular basis regardless of what year they are at CMU. We then considered stratifying our sample by men and women, but came to the same conclusion in that we want to find out overall problems and satisfaction levels from all CMU undergraduate students who utilize the UC gym.

Therefore, we have concluded that a simple random sample without replacement will be most ideal for our project. Based on what we are striving to find out, we feel that this method will give us the best sample and the most accurate results.

Sampling Size

In order to calculate the sample size necessary for our project, we used a formula for sample size calculation (SRS without replacement).

$$n_0 = [z_{\alpha/2}^2 (SD)^2] / (ME)^2, \text{ where } n \geq Nn_0 / (N+n_0)$$

$$\begin{aligned} SD &= [p (1 - p)]^{1/2} \\ &= [.5 (1 - .5)]^{1/2} \\ &= .5 \end{aligned}$$

$$\text{Let ME} = .055 \text{ or } 5.5\%$$

$$[(1.96)^2 (.5)^2] / (.055)^2 = 317.4876$$

$$\begin{aligned} n &\geq (N * n_0) / (N + n_0) \\ &\geq (5951 * 317.4876) / (5951 + 317.4876) \\ &\geq 301.407 \end{aligned}$$

Assumptions for sample size calculation:

In order to calculate our standard deviation, we let our p value be .5 because we are estimating p and are not sure what the value is. Thus, we choose .5 because that is the worst-case guess for p.

We are using 5.5% as our margin of error. After analysis, the 5.5% margin of error accounts for any random sampling error that we may encounter through our survey.

Since we expect a response rate of approximately 25%, and we want a sample size of 301 students, we will randomly sample $(301/.25) = 1,204$ undergraduate students at the Carnegie Mellon Pittsburgh campus. By sampling 1,204 students, we will compensate for any non-response that we may encounter through our sampling.

Respondents and Nonresponse

Based on our sample size calculation, we contacted 1,320 undergraduates via email on March 18th, 2010. We also sent a reminder email on March 28th, 2010. The email that we sent was through QuestionPro.com and included a link to the survey (See Appendix A). Of the 1,320 students that we sent emails to, 384 students viewed our survey and 352 students started our survey. So far, we have had 301 students actually complete the survey. This means that our completion rate is 85.51% (of those who viewed our survey) and our non-response rate is 77.197%. We received one angry email from a student who claimed that he had been “spammed” with emails from our class. As a result, we sent an apologetic email back to him and removed him from our email list. In order to get the other 40 students to complete the survey, we plan to send a final reminder email.

Questionnaire

The questions that we asked on our survey began with demographic information. We then went on to ask about activity level and frequency of UC athletic facilities on a weekly basis. Our questions then became more specific as to which facilities were used most and if students had to wait for certain facilities in order to use them. We also asked about cleanliness, ease of use, the locker rooms, and check in process. We concluded by asking students about three suggested improvements and three things that the UC athletic facilities were doing well.

Please see Appendix A for the original email that we sent to students.

Please see Appendix B for the reminder email that was sent.

Please see Appendix C for our statement of informed consent.

Please see Appendix D for our full survey.

Post-Survey Processing

After we closer our survey, we will determine what our overall demographic information is and compare it to the actual demographic information of CMU undergraduates. Depending on the discrepancies, we will weight our answers and results. Additionally, if specific questions are left unanswered, we will utilize imputation to receive more accurate results.

Section 3: Results

Research Question

Our goal is to research how CMU undergraduates feel about the UC athletic facilities. We hope to find out what improvements can be made to the athletic facilities to maximize students' satisfaction.

Statistical Analyses

After we close our survey, we will perform detailed statistical analyses of our data. This means that we will run regressions on each question. We will additionally find correlations between questions and demographic information provided.

Section 4: Discussion

Survey Effectiveness

We strongly feel as though our survey questions did an excellent job answering these three main questions. We were able to ask basic demographic questions to identify the characteristics of UC gym goers. The survey then asks questions that allowed survey takers to list which facilities they use, and rate their overall satisfaction. Our group then designed the survey to emphasize specific aspects of the UC athletic facilities such as the check-in process, locker room, wait-times, and online reservation process. We feel that our survey caters to all aspects of the UC athletic facilities, and is able to pinpoint specific aspects that can be approved on. In the end, we are able to take the answers from the survey to answer the main questions above.

Surprising or Expected Results

Through the initial analysis of our data, we were able to find both surprising and expected results. We found it very surprising that out of the all the survey takers, 27.67% of the facility users categorized themselves as having a “moderate level of activity” (physical activity for 3-5 hours per week).

Something that we expected was the general negative opinion of the check-in process of all the UC-gym facilities. Being regular gym goers, we thought that the process of swiping your student id card then obtaining a wrist band was very inefficient and a waste of paper. As a group, we identified this problem and wanted to see if this was

the general opinion of the UC gym users. As expected, the general sample felt that it was highly inefficient and stated that a card swiping mechanism at the entrance of each facility would be much more convenient.

Strengths and Weaknesses of the Survey

Strengths:

- 1) Some questions provided space for survey takers to give their own opinions about a topic
- 2) Our sample selection process was very effective
- 3) Identified all facilities available in the UC gym

Weaknesses:

- 1) Did not account for other gym facilities on campus (for example, Skibo gym users)
- 2) We could have identified more possible areas of improvements regarding each facility

The list of strengths and weaknesses listed above is not the complete list. It should be made clear that our collection process is not complete. Once we have collected enough samples, we can then again analyze the data and questions and identify more strengths and weaknesses.

Recommendations for the Future

In future studies, we recommend that students survey all of the athletic facilities on campus. We would have to create a different survey that is specific to each athletic facility, so that we would get more specific feedback on them. We ran the risk of students answering our survey based on their feelings about different athletic facilities. Thus, we would want to minimize this risk by creating facility-specific surveys.

We will expand upon our recommendations once we have conducted our statistical analyses. Only then will we be able to tell exactly what information is lacking and what we could have done better.

Take-Home Messages

We will identify a take home message after we complete all aspects of our project. It is important to have everything complete before we come up with a message because we will be able to sum up the data, and implement solutions to the problems identified.

References

We will compile our references at the end of our project after all the analyses have been performed and all the data has been collected.

Appendix A

We are a group of students currently enrolled in 36-303: Sampling, Survey, and Society. As a part of this course, we are conducting a study on CMU students' satisfaction with and utilization of the UC athletic facilities.

You have been selected to participate in our study! We would greatly appreciate if you could take our online survey at the link below by Friday, March 26th. It will only take approximately 5 minutes and would help us tremendously!!

Survey Link: <SURVEY_LINK>

We greatly appreciate your time and effort!

We know how busy your lives are and want to thank you for helping us to do better in this course!!

Regards,

Chris Lee, Swetha Reddy, Sonam Rajpal, Jung Yub Lee, and Siddhartha Gupta
Group C - 36-303: Sampling, Survey, and Society

Appendix B

We really need your responses!!! We have about half the number of respondents that we need to accurately analyze our data. So far, the average time to take the survey has been 4 minutes, so please help us out and take our survey!! We know how busy you are but sincerely hope that you can find a few minutes to help us out.

Survey Link: <SURVEY_LINK>

Thanks again!!

We are a group of students currently enrolled in 36-303: Sampling, Survey, and Society. As a part of this course, we are conducting a study on CMU students' satisfaction with and utilization of the UC athletic facilities.

You have been selected to participate in our study! We would greatly appreciate if you could take our online survey at the link below by Friday, March 26th. It will only take approximately 5 minutes and would help us tremendously!!

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We greatly appreciate your time and effort!

We know how busy your lives are and want to thank you for helping us to do better in this course!!

Regards,

Chris Lee, Swetha Reddy, Sonam Rajpal, Jung Yub Lee, and Siddhartha Gupta
Group C - 36-303: Sampling, Survey, and Society

Appendix C

You are invited to participate in our survey about the CMU University Center athletic facilities. It will take approximately 5 minutes to complete the questionnaire.

Your participation in this study is completely voluntary. The probability and magnitude of harm or discomfort anticipated in the following survey are not greater, in and of themselves, than those ordinarily encountered in daily life or during the performance of routine physical or psychological examination tests. However, if you feel uncomfortable answering any questions, you can withdraw from the survey at any point.

Your survey responses will be strictly confidential and data from this research will be reported only in the aggregate. Your information will be coded and will remain confidential. If you have questions at any time about the survey or the procedures, you may contact Swetha Reddy by email at swethar@andrew.cmu.edu.

Thank you very much for your time and support! Please start with the survey now by checking the box below, if appropriate, and clicking on the Continue button below.

Appendix D

1) Are you a current full-time undergraduate student on the Pittsburgh campus?

_____ Yes

_____ No

2) What undergraduate year are you?

_____ Freshman

_____ Sophomore

_____ Junior

_____ Senior

_____ 5th Year Scholar

3) What is your age?

_____ < 18

_____ 18

_____ 19

_____ 20

_____ 21

_____ 22

_____ > 22

4) What academic department are you in? Select all that apply.

_____ H&SS (Humanities and Social Sciences)

_____ MCS (Mellon College of Science)

_____ CIT (Carnegie Institute of Technology)

_____ SCS (School of Computer Science)

_____ CFA (College of Fine Arts)

_____ TSB (Tepper School of Business)

_____ SHS (Science and Humanities Scholar)

_____ Other. Please list: _____

5) What is your gender?

☐ Male

☐ Female

6) Where do you live?

☐ On Campus

☐ Off Campus

7) What is your ethnicity? Please select all that apply.

☐ American Indian or Alaskan Native

☐ Hawaiian or Other Pacific Islander

☐ Asian or Asian American (includes South Asian subcontinent)

☐ Black or African American

☐ Hispanic or Latino

☐ Non-Hispanic White

☐ Other

8) How would you describe your physical activity level? (This includes playing sports, lifting weights, jogging, etc.)

☐ Inactive (do not work out at all)

☐ Very Low (work out less than 1 hour per week)

☐ Low (work out 1-2 hours per week)

☐ Moderate (work out 3-5 hours per week)

☐ High (work out 5-7 hours per week)

☐ Very High (work out 7+ hours per week)

9) The following is a list of the UC athletic facilities. Please select all that you have used in the past semester thus far.

- ☐ Weight/Treadmill Rooms
- ☐ Racquetball/Squash Courts
- ☐ Basketball Gymnasium
- ☐ Pool/Diving Board
- ☐ Activities/Dance Room
- ☐ Other. Please list: _____

10) In the past week, how many times did you use a UC athletic facility (including courts and gyms)?

- ☐ 0 – 1 Time
- ☐ 2 – 4 Times
- ☐ 4 – 6 Times
- ☐ More Than 6 Times

11) Is the response in the previous question typical of how many times you use a UC athletic facility on a weekly basis?

- ☐ Yes
- ☐ No
- ☐ N/A

12) Please select the answer that you feel is best:

The facility(ies) that you use are clean.

- ☐ Strongly Agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly Disagree
- ☐ N/A

13) Have you spent time waiting to use any of the following machines or facilities? Or have you been unable to use any of the following machines or facilities because they were already being used? Please select all that apply.

- ☐ Weights
- ☐ Treadmill
- ☐ Elliptical
- ☐ Racquetball/Squash Courts
- ☐ Basketball Gymnasium
- ☐ Pool/Diving Board
- ☐ Activities Room
- ☐ Have never had to wait
- ☐ Other. Please list: _____

14) The equipment available in the facility(ies) that you use are effective and serve their purpose.

- ☐ Strongly Agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly Disagree
- ☐ N/A

15) Machines or equipment that you do not use often or have never used are well explained by instructions and easy to use.

- ☐ Strongly Agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly Disagree
- ☐ N/A

16) Have you ever rented/reserved a specific facility space in the UC?

_____ Yes

_____ No

17) How easy was the process to rent/reserve a specific facility in the UC?

_____ Very Easy

_____ Easy

_____ Neutral

_____ Difficult

_____ Very Difficult

_____ N/A

18) The check-in process is efficient (wristband/card swipe).

_____ Strongly Agree

_____ Agree

_____ Neutral

_____ Disagree

_____ Strongly Disagree

_____ N/A

19) Would you make changes to the check-in process?

_____ Yes

_____ No

If yes, please specify

20) Have you used the locker room in the past?

_____ Yes

_____ No

21) The locker room is satisfactory.

_____ Strongly Agree

_____ Agree

_____ Neutral

_____ Disagree

_____ Strongly Disagree

_____ N/A

22) Please list 3 things that you like about the UC athletic facilities.

23) Please list 3 changes that would improve the UC athletic facilities for you.
