Team G, I.2

by Shannon Lauricella

Proposal #1:

A. Interest 10/10

B. Research Questions 10/10

C. References 5/5

D. Sampling Frame 8/8

E. Target Population 8/8

F. Mode of Data Collection 5/5

G. Important Variables 4/4

This looks like a nice project. I think you will also be fairly happy with sample size requirements when you get to that part of the project (soon!).

Proposal #2:

A. Interest 10/10

B. Research Questions 10/10

C. References 5/5

D. Sampling Frame 6/8

E. Target Population 8/8

F. Mode of Data Collection 5/5

G. Important Variables 4/4

This is a very doable project. If you choose it, I want you to construct your own sample from C-Book and contact students to get the information from them, rather than try to get admin records from the registrar's office. I don't think going to the registrar will be successful.

98/100

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1. Proposal I.2- Out-of Campus

Description of Rainwater Accredited Professional by Type of The American Rainwater Catchment Systems Association (ARCSA)

Ariel Liu, Sam Lavery, Alejandra Munoz, Terra Mack, Shannon Lauricella.

A. Topic

Rainwater Harvesting in the United States is a practice/technology/business that in recent years has expanded adepts and adopters. Initially, rainwater collection was pushed by droughts and groundwater depletion and pollution in arid regions of the U.S. as a source of fresh water supply (e.g. Texas and California). Nowadays, this practice/technology is considered to be a key element in converting U.S. cities (and their infrastructures) to sustainable environments. Rainwater collection not only provides fresh water supply, but it also manages storm water runoff and its pollution and opens the possibility of reuse and energy generation through, for example, fuel cells[1]. Taking into account that the demand of incorporating rainwater harvesting systems in architecture design is expected, we are urged to describe and quantify the architects that belong to ARCSA to prepare and produce future guidelines and tools that help the architects face this new demand. ARCSA, architecture schools and researchers are the potential clients of this survey. 10/10

B. Questions of the study

Before guidelines and tools can be proposed to help architects integrate rainwater harvesting in their design, we want to know how exactly architects today are incorporating this technology in their design. We would like to know what motivates them to learn, join and obtain the ARCSA certification, how long it took them to obtain the certification, which topics were the most challenging and what knowledge is most essential when creating designs for rainwater harvesting. 10/10

C. Research

1. Title: NM Grower Harvest Rain Before Veggies
   Author name(s): Douglass Pushard
   Date: June 2010
   Source: The Quarterly Newsletter of ARCSA, Volume 1, Issue 2, pp. 5
   http://www.arcsa.org/files/ARCSA%20June%202010%20Newsletter.pdf
   Summary: The newsletter gives insight into the types of professionals associated with ARCSA and the uses of harvesting rainwater. This article shows that harvesting rainwater serves several different purposes among different professions and environments, which would be useful in our survey for assessing types of professionals in ARCSA.
   Team member: Terra Mack 5/5

2. Title: Domestic rainwater harvesting to improve water supply in rural South Africa
   Author name(s): Jean-Marc Mwenge Kahinda, Akpofure E. Taigbenu, Jean R. Boroto

[1] "A fuel cell is an electrochemical device that combines hydrogen and oxygen to produce electricity, with water and heat as its by-product. As long as fuel is supplied, the fuel cell will continue to generate power. Since the conversion of the fuel to energy takes place via an electrochemical process, not combustion, the process is clean, quiet and highly efficient – two to three times more efficient than fuel burning." Hydrogen also can be obtained from water. http://www.fuelcells.org/

Date: August 2007
Source: Physics and Chemistry of the Earth, 32 (2007) 1050-1057
Summary: This journal article provides background on why the topic of rainwater harvesting is so important to civil and environmental engineers. It describes the social implications and improvements that could be made with continued research into methods of harvesting rainwater.
Team member: Shannon Lauricella

3. Title: Introducing Sustainability into the Architecture Curriculum in the United States
Author name(s): James Wright
Date: 2003
Source: International Journal of Sustainability in Higher Education, Volume 4, Issue 2
http://www.emeraldinsight.com/journals.htm?issn=1467-6370&volume=4&issue=2
Summary: Our survey intends to target architects working for ARCSA and this article serves to demonstrate the relevance of our target population. The purpose of this article is to explain how inextricably linked architecture and sustainability are. It provides a good framework for why architects should be involved with projects, like harvesting rainwater, that provide sustainability.
Team member: Sam Lavery

4. Title: Strategy Use and Challenges of Ecological Design in Landscape Architecture
Author name(s): Meg Calkins
Date: 2004
Source: Landscape and Urban Planning Volume 73, Issue 1 http://www.sciencedirect.com/science/article/pii/S0169204604000945
Summary: This survey tried to identify the reasons why ecological design advancements were not being implemented in landscape architecture. It provides a basis for trying to understand the professional make-up of a ecological design team such as ARCSA.
Team member: Ariel Liu

5. Title: U.S. Rainwater Harvesting Market - 2010 and beyond
Author name(s): Doug Pushard and Jason Kerrigan
Date: 4 October, 2010
Source: Audio visual presentation of ARCSA conference presentation in Austin, Texas. http://www.arcsa.org/content.asp?admin=Y&contentid=91
Summary: Presentation of the findings of a survey to an array of businesses across of the U.S. rainwater harvesting market. Results represent a boost to the anecdotal evidence that - even in a slow economy - rainwater harvesting is a growing market.
Team member: Alejandra Munoz Munoz

D. What is the sampling frame? What population or populations do you plan to sample from? (This is the question many tend to miss).

The sampling frame is composed of a directory containing the contact information for a number of certified professionals of ARCSA. We plan to use a directory that is comprised of all businesses (around 300) that have one or more employees who are ARCSA-certified professional. 8/8

We believe that focusing on ARCSA certified architects could leads us to better estimates

about the motivations and needs of architects that are designing with rainwater harvesting systems. ARCSA educational courses lead to different levels of knowledge and expertise starting from introductory levels to preparation for professional certification. The introductory levels that comprise basic courses and accreditation courses are expected to form a "minimum level of competency and general knowledge in rainwater management techniques and theory" (ARCSA 2012). The courses that focus on certified levels and the certification test itself seek to provide and ensure depth knowledge on piping and system design as well as on evaluation and "practical application in constructing a rainwater catchment system." For that reason, we would like to target architects that are certified by ARCSA.

E. What is the target population?

8/8

The target population is all certified architects who are members of ARCSA.

To what population(s) do you wish to make inferences?

We will make inferences about all certified architects who are members of ARCSA that design integrating rainwater harvesting systems.

What possible sampling and non-sampling errors could arise in the survey that you plan to conduct? Explain each possible error, how it could occur, and how you suggest tackling it

This survey could encounter coverage error if the ARCSA directory records are incomplete. The target population coverage depends on the completeness of the ARCSA records. It is possible that architects that obtained the professional certification have not listed their services in the ARCSA directory or they are not members of the association. Being a certified ARCSA professional does not includes the membership to the organization, and thus, they do not have access to the service of listing their business in the ARCSA website. Another error that might arise is sampling error due to errors in the contact information, non-updated contact information or discrepancies in the contact information found in the sampling frame (directory). Problems with the contact information could exclude part of the sampling frame. This problem could be solved by searching for businesses in other directories rather than the ARCSA directory.

what aboutcertfied architects who are not members of firms on the list of 300?

F. What is the mode of data collection? How do you plan to carry out the survey (e.g., by telephone, e-mail) and why?

We will use a combination of administrative records, which is the directory of ARCSA certified professionals, and administer a questionnaire to the members of the directory ARCSA who are architects. We will contact the businesses who employ members of ARCSA and inquire as to if these employees are architects. If so, we will contact these architects via e-mail and administer our survey questions via a web survey.

Taking into account that the business listed in the ARCSA directory (and their certified professional) are distributed through the entire U.S., our limited monetary resources, and time

5/5

constraints from both parts, interviewers (we) and interviewees, we believe that a combination of telephone, email to make the contact, and then, a web survey is the most cost-effective approach to cover the sampling frame.

G. What variables do you propose to measure?

What motivated these architects to take the certification test? (money, environmental reasons, required by employer (i.e. LEED)) 4/4

How long it took the architects to prepare for the certification test?

Which were the challenging topics during the preparation for the test?

What is the knowledge that you most apply when designing buildings that use rain water harvesting?

Where are these architects working currently? (location/company)

We also plan to measure demographic variables including age, sex, and ethnicity.

1. Proposal I.2 - On Campus

Spatial and Analytical Study of Student Housing at Carnegie Mellon

Ariel Liu, Sam Lavery, Alejandra Munoz, Terra Mack, Shannon Lauricella.

A. Topic

Carnegie Mellon is an urban university with many students living off-campus. Finding housing off-campus is generally left up to individual students, who take into account many variables when choosing a house or apartment. Many students list their off-campus addresses in the C-Book directory published by APhiO. We are interested in investigating the possibility of a correlation between where students choose to live and what they choose to study. The results of the survey will be a valuable tool that would be useful to the university for the planning of shuttle routes, campus police coverage, and future housing projects. Students would also be able to use the survey results to find neighborhoods in the city that are popular with other students like themselves. 10/10

B. Questions of the study

We are seeking to answer questions about the dynamics of student housing at CMU. Some questions that we want to investigate include: 10/10

- Is there a correlation between address (either on-campus building or off-campus neighborhood) and major? Do students in certain majors cluster togeter?
- What is the distribution of CMU students by neighborhood?
- What off-campus areas are most popular with undergraduates? With graduate students?
- What percent of off-campus students live within X miles of a shuttle or bus stop.
- What is the average commute distance for undergraduates? For graduate students?

C. Research

1. Title: The Causal Effect of Campus Residency on College Student Retention
   Author name(s): Lauren T. Schuddle
   Date: Summer 2011 5/5
   Source: *The Review of Higher Education*, Volume 34, No. 4, pp. 581-610
   http://muse.jhu.edu/journals/review_of_higher_education/v034/34.4.schudde.html
   Summary: Assessing demographics and certain characteristics among those college

students who live on and off campus, particularly how campus residency affects retention of students. Our survey could drawn on some of the insight for possible survey measures and execution in looking at campus residency and characteristics among CMU's student populaton.
Team member: Terra Mack

2. Title: Campus Housing Construction and Renovation
Author name(s): James C. Grimm, Norbert W. Dunkel
Date: June 1999
Source: Full-length book published by *The Association of College and University Housing*
Summary: This book investigates the relationship between college students and their physical environments by specifically looking at 42 projects in 36 different universities. Housing characteristics studied in the book could be incorporated into the questions asked in our survey.
Team member: Shannon Lauricella

3. Title: Housing: A Financial Look
Author name(s): Michael R. Fitzgerald
Date: September 25, 2006
Source: CMU's *The Tartan*
http://thetartan.org/2006/9/25/news/housing_realestate
Summary: This article, published in Carnegie Mellon's own newspaper, specifically highlights some of the points we want to survey students on-campus. It talks about the price differential in living on-campus versus off-campus as well as the nature of housing prices in close proximity to Carnegie Mellon. Most importantly, this article shows that CMU students have an interest in their housing options, making our suggested survey more relevant.
Team member: Alejandra Munoz Munoz

4. Title: A Quasi-Experimental Approach to Estimating the Impact of Collegiate Housing
Author name(s): Ryan Yeung
Date: 2010
Source: http://student.maxwell.syr.edu/ryyeung/college.doc
Summary: Yeung attempts to identify the relationship between on/off-campus housing with GPA and social and academic integration. This is relevant to studying how areas of academic study play into college housing and proximity to campus.
Team member: Ariel Liu

5. Title: The Disengaged Commuter Student: Fact or Fiction?
Author name(s): George D. Kuh, Robert M. Gonyea, Megan Palmer
Date: 2001
Source:http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.182.9974&rep=rep1&type=pdf
Summary: This paper present the findings of a survey that wanted to answer if students that live off-campus are less engaged with studies compared to students that live on campus. Engagement is defined as an important part of the academic experience and it is believed that off-campus housing interferes with this process.
Team member: Sam Lavery

D. What is the sampling frame? What population or populations do you plan to sample

6/8

from? (This is the question many tend to miss).

It's not clear you can get this information from the registrar. You are much better off constructing your own sample from C-book and contacting students directly and getting the info from them.

The sampling frames comes from the administrative records of the university registrar, John Papinchak, and the C-book.We plan on looking at housing information from undergraduate and graduate students enrolled at Carnegie Mellon.

E. What is the target population? To what population(s) do you wish to make inferences?

8/8

The target population is undergraduate and graduate students enrolled at CMU. It is the same population that we are looking to make inferences about from our survey. The target population differs from the sampling frame in that the registrar is only providing a sample of students enrolled at CMU. Thus, we won't have access to information for the entire population enrolled. Therefore, our sampling frame will include only those students who comply with the registrar's office or volunteered their information to CMU.

What possible sampling and non-sampling errors could arise in the survey that you plan to conduct? Explain each possible error, how it could occur, and how you suggest tackling it.

This survey could encounter coverage error if the registrar's records are incomplete .The target population coverage depends on the completeness of the registrar office records. When a student leaves on-campus housing, they are asked to update their address on SIO but many probably fail to do so. Additionally, some people may change addresses again and not update this information. If we do not have enough complete records or information for students then we might need to interact with students or use another type of less invasive method of survey. One solution to this problem would be to find the ratio of current students living in on-campus housing and weight our sample to account for any discrepancies. We could easily find the correct ratio by dividing the number of students living in dorms by the total student body.

F. What is the mode of data collection? How do you plan to carry out the survey (e.g., by telephone, e-mail) and why?

5/5, but see comment on part D above

We plan to collect the data from administrative records provided by the office of the registrar. However, if the data set provided is too large, then we plan to randomly select a representative subsample of students to "survey". We believe surveying data records is a more accurate and reliable method in comparison to directly asking students. This mode of collection and survey can help reduce high non-response and coverage errors.

G. What variables

We want to study the following variables:

School (MCS, CIT, HSS, etc)
Major
Location (address)
Class Year / level (graduate, undergraduate)

4/4