

Consulting on an Island: A Novel Approach to Teaching Statistical Collaboration Skills



Joint Statistical Meetings, Seattle
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ASA Curriculum Guidelines for Undergraduate Programs in Statistical Science (2014)

- **“Real applications.** ...Programs should ...provide experiences in designing studies and analyzing non-textbook data.”
- **“Ability to communicate.** Students need to be able to communicate complex statistical methods in basic terms to managers and other audiences ... Programs should provide multiple opportunities to practice and refine these statistical practice skills.”
- How?

www.amstat.org/education/curriculumguidelines.cfm

Collaborative Approach



Biostatistical Literacy Course in Public Health

- Online graduate course
- Medical/public health professionals
- Emphasize statistical concepts
- No calculations



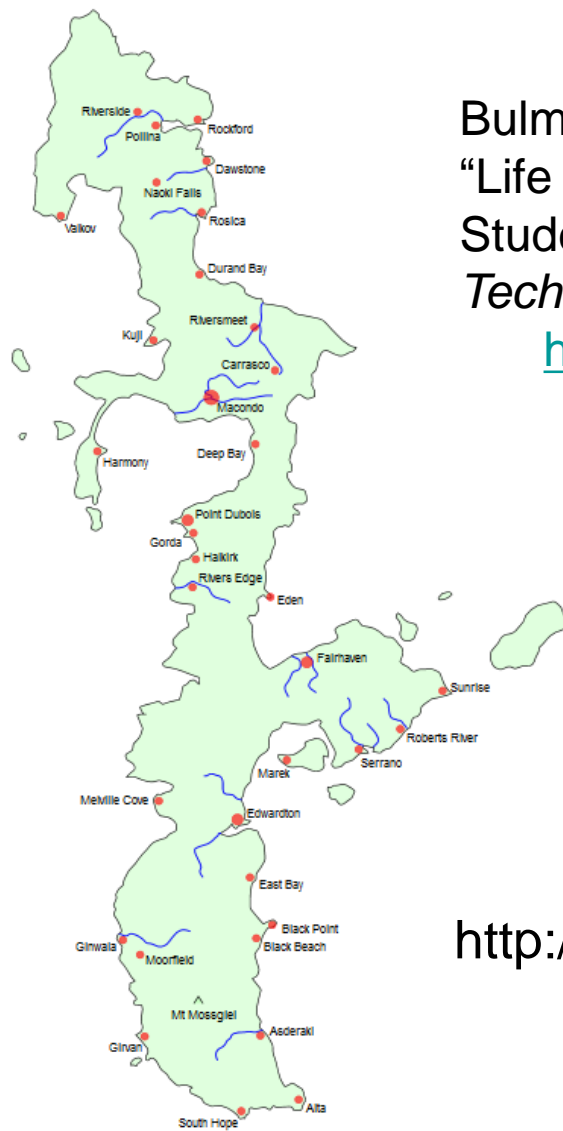
Island Project

- Google Hangouts



Consulting/Communication Course in Statistics

- Traditional classroom
- Seniors in statistics, mainly international
- Analytically proficient
- Emphasize consulting, writing & verbal skills



Bulmer, Michael and Haladyn, J. Kimberly (2011).

“Life on an Island: a Simulated Population to Support Student Projects in Statistics.”

Technology Innovations in Statistics Education (TISE) 5(1).

<http://escholarship.org/uc/item/2q0740hv>

<http://island.maths.uq.edu.au>



Alondra Gonzalez

^ HOME CONTACTS BIO SURVEY LOGOUT

Recent Tasks

Survey

▼ Blood Tests

Blood Adrenaline
Blood APTT
Blood Cholesterol
Blood Endorphin
Blood Estrogen
Blood Ghrelin
Blood Glucose
Blood Hematocrit
Blood Melatonin
Blood Oxytocin
Blood Potassium
Blood Serotonin
Blood Sodium
Blood Testosterone
Blood Type
Blood Vitamin D
Breathalyzer
CDZ Lymphocyte Count
Gene Array (Chromosome 1)
Gene Array (Chromosome 2)
Gene Array (Combined)
White Blood Cell Count

Urine Tests

Physiology

Alcoholic Drinks

Nonalcoholic Drinks

Food

Injections

Tablets

Other Drugs

Mental Tasks

Coordination

Exercise

Music

Environment

Interventions

Miscellaneous

Alondra Gonzalez

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Recent Tasks

Survey

Blood Tests

Urine Tests

Physiology

Alcoholic Drinks

Nonalcoholic Drinks

Food

▼ Injections

Adrenaline 10 µg
Erythropoietin 1000IU
Glucose 10%
Glucose 5%
Hypertonic Saline Injection
Hypotonic Saline Injection
Influenza W42 50 µg
Methamphetamine 50 mg
Morphine Injection 20 mg
Natural Insulin 1 unit
Saline Injection
Serotonin 10 µg
Somatropin 1000 µg
Synthetic Insulin 1 unit

Tablets

Other Drugs

Mental Tasks

Coordination

Exercise

Music

Environment

Interventions

Miscellaneous

Alondra Gonzalez

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Alondra is 43 years old and lives in **Macondo**.

- Alondra is currently having her blood alcohol concentration measured...

- [View task history](#)

- [Add Alondra to my contacts](#)

- [Edit her biography](#)

November 1971

Born in Macondo



Camila Gonzalez
Mother



Fabian Gonzalez
Father

October 1987



Dating Riku Carrasco

August 1988

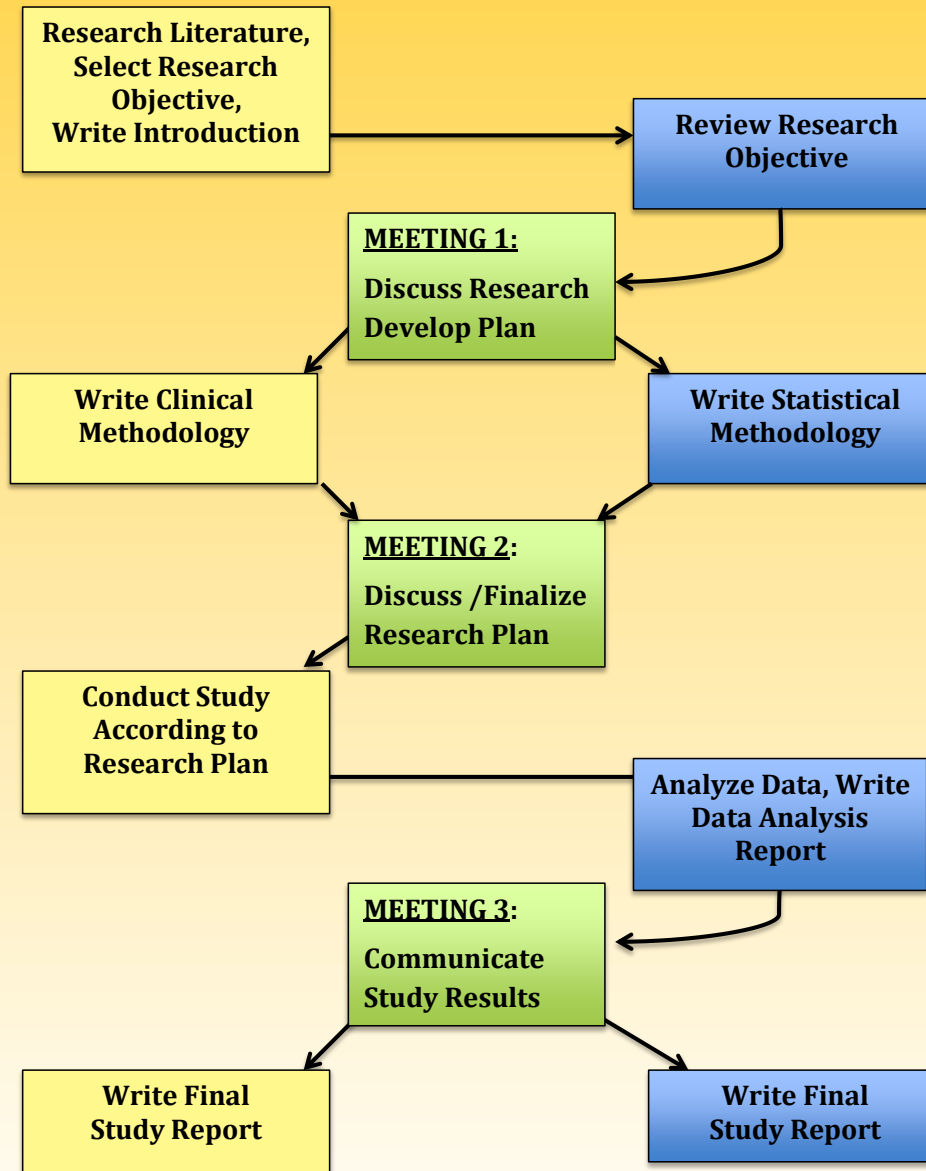
Single



UNIVERSITY OF MINNESOTA
Driven to DiscoverSM

Client/Investigators

Consultants



Island Studies Examples

- Effects of Methamphetamine on Cognitive Function in Young Adults
- **RE-WINE**: The Effect of Red Wine on Serotonin Release
- The Effect of Cannabis Tea on Short Term Memory Scores
- Effect of diabetes on the blood glucose level of “The Island” population after exercise
- **YIKES!** Youth Islander Knowledge Enhancement Study [Effect of Dextroamphetamine on Arithmetic Performance]
- Effects of Smoking on Pulmonary Functioning and Exercise Tolerance
- Effects of Music on Blood Pressure
- The **DREAM** Study: The Effect of Different Exercise Assignments on Melatonin



Evaluation and Improvement

- Instructors need to moderate the client/consultant meetings
 - Draw out both consultants and clients to talk when needed
 - Prompt both sides to be clearer when necessary
 - Correct bloopers
- Altered group sizes to have few enough groups to be able to monitor them effectively
- Reduced number of required meetings
- Developed clearer instructions: e.g. flowchart, meeting checklists
- Found that many of the consultants needed to review basic statistics, sample size estimation. Added review material.
- Added role playing exercises to prepare for the client meetings

Benefits for Student/Clients

- Application – Students apply the concepts and methods they learn in class to a ‘real’ study
 - Study design, sampling methods
 - Collecting and organizing (and cleaning!) data
 - Analysis and interpretation
- Collaboration – Students learn the necessity of teamwork, across specialties, to carry out a research study. They learn what works well and what doesn’t for a cross-functional geographically dispersed team.

Benefits for Student/Consultants

- Provides experience with real clients / real challenges
- Develops problem solving skills
- Provides speaking and writing experience
- Generates interest from potential employers:
 - “I had an interview at the Federal Reserve Board where I discussed my consulting experience. They seemed very impressed that I got such an experience.”
 - “I recently had an interview and they were interested in [my] interactions with the biostats students, the results that my group came up with and the Island program itself.”

Benefits for Instructors

- Improves teaching
 - Brings out issues students are having difficulty with, e.g. random sampling vs. random assignment.
Provides a built-in example to use in explanations.
- Provides reality check for the effectiveness of the undergraduate statistics program
- Makes instructor-student relationship more collegial
 - Instructors/TAs become statistical collaborators.
(Instructor doesn't know 'the answer'!)
 - Vastly increases the amount of non-homework-, non-exam-related interaction with students.

Conclusions

- Many positives
 - Plan to continue into 4th semester this fall
- Biggest challenge: scalability
 - TAs with consulting experience help!
 - Future: Add peer-review?

Questions?

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