

Scholarship of Teaching and Learning
HYBRID CONFERENCE

24 - 26 October
2022 Oktober
Okthobha

ASSESSMENT MATTERS:

Re-imagining assessment culture and
practices for a transformative student
experience
www.sun.ac.za/sotl

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SurveyLab

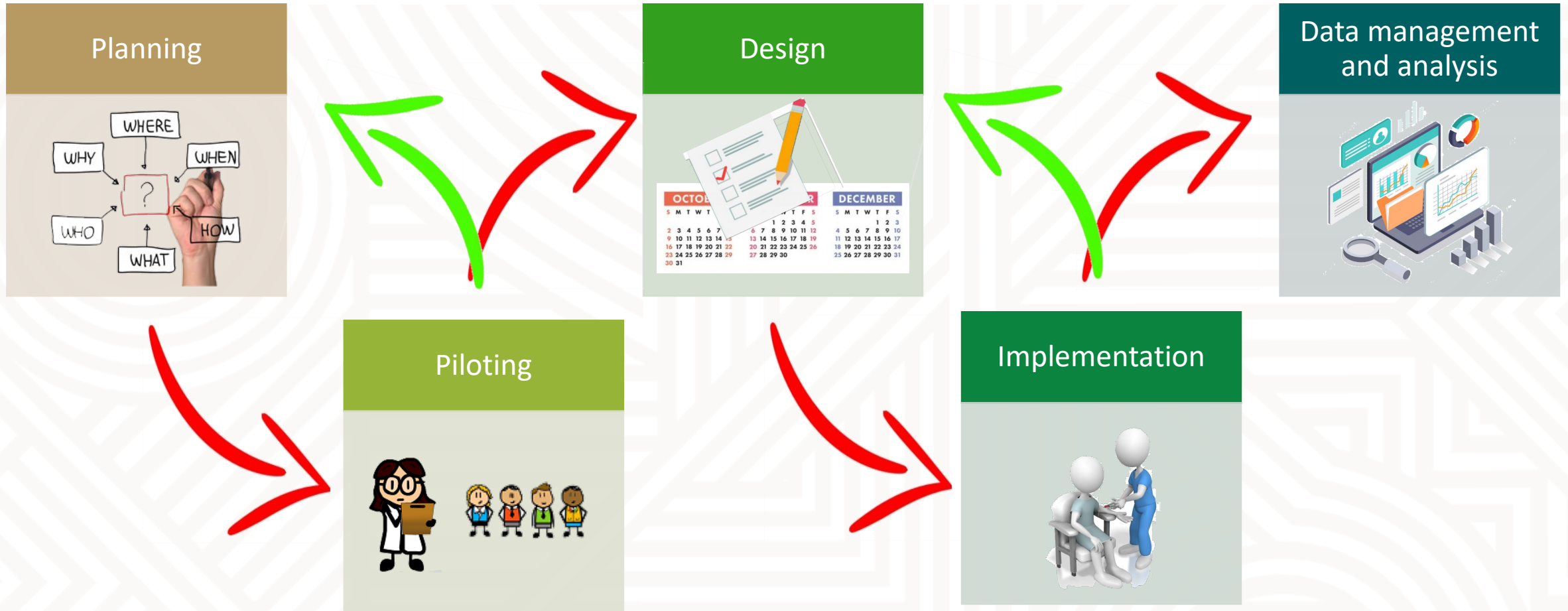
a virtual environment for teaching and learning survey methods

*Annibale Cois, Lungiswa Nkonki
Division of Health Systems and Public Health*

Stellenbosch University, 26 October 2022

- Background: why did we start this project?
- The idea: a virtual population
- What was available? And why we needed something new?
- The *SurveyLab*: what is it?
- Development, preliminary evaluation
- What's next?

Background





COST

DATA QUALITY

SAMPLING STRATEGIES

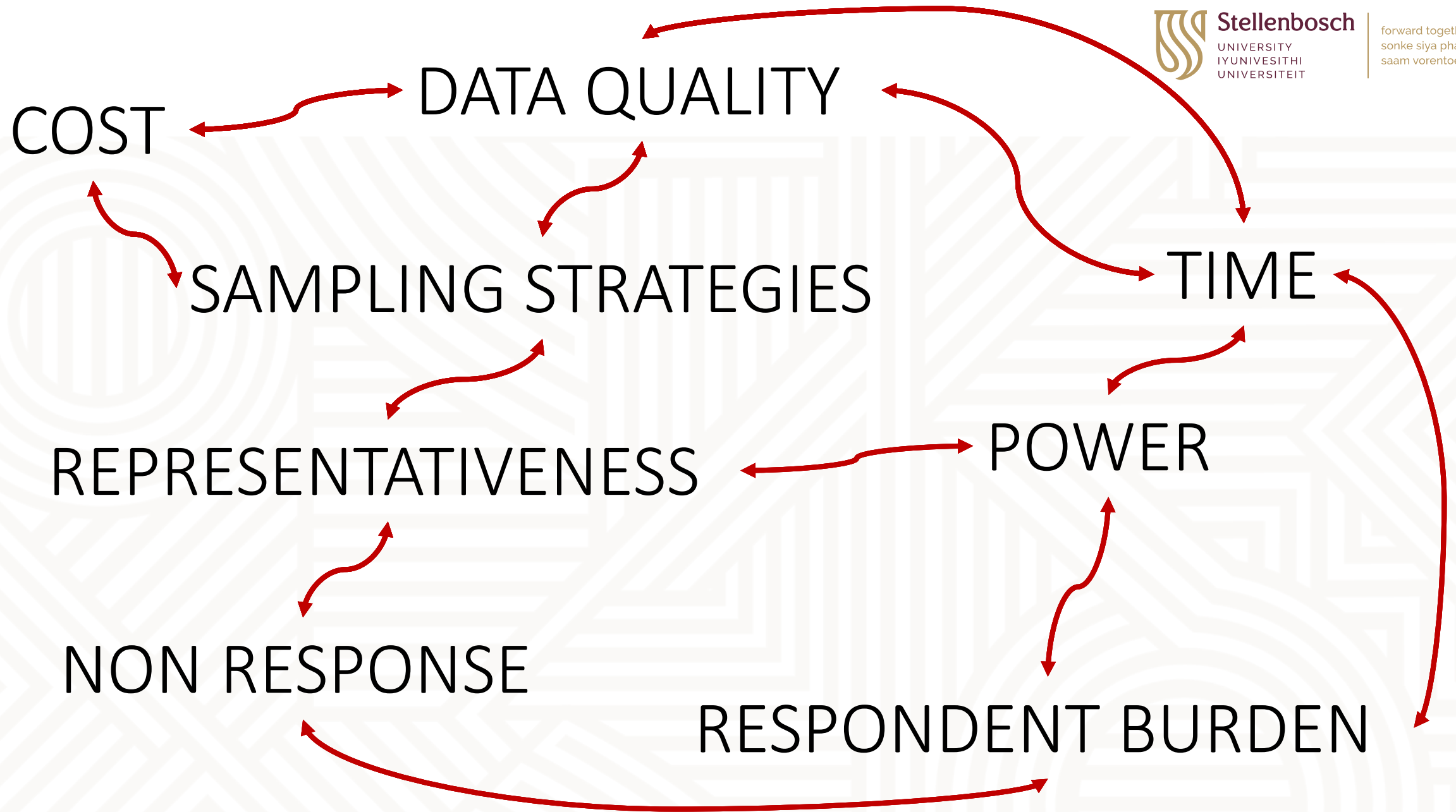
TIME

REPRESENTATIVENESS

POWER

NON RESPONSE

RESPONDENT BURDEN





Active involvement in designing sampling strategies and data collection allows students to **experience difficulties and cost of obtaining quality data** and the often neglected importance of proper data management. Seeing data together with the **context** they originate from allows for a deeper understanding of **strengths and limitations of the different analysis techniques** and a better appreciation of the **strong interdependency** between the various phases of a research project, from the definition of the sampling strategy and sample size calculation until the interpretation of the analysis results.





SEMESTER COURSE??

The idea

The background of the slide is a large, dense crowd of stylized human icons in various colors and outfits, representing a diverse population. A magnifying glass is positioned over the center of the image, focusing on a white circular text box. The text box contains a list of five bullet points.

- No risk
- No economic cost
- Short lifecycle of ‘surveys’
- The conditions can be adapted to the teaching needs
- We know the ‘truth’”

The use of virtual populations for research and teaching is not new...

- Demography

<https://www.learner.org/wp-content/interactive/envsci/demographics/demog.html>

- Pharmacology

<https://www.sciencedirect.com/science/article/pii/S0300483X13001856>

- Ecology

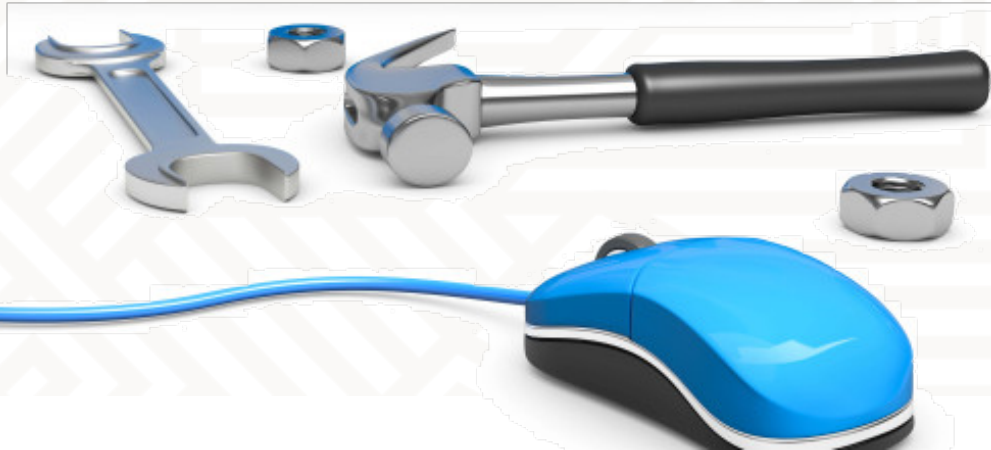
<https://virtualbiologylab.org/population-ecology/>

- Biology

<https://iopscience.iop.org/article/10.1088/0031-9155/59/18/5287>

- Epidemiology

<https://islands.smp.uq.edu.au>



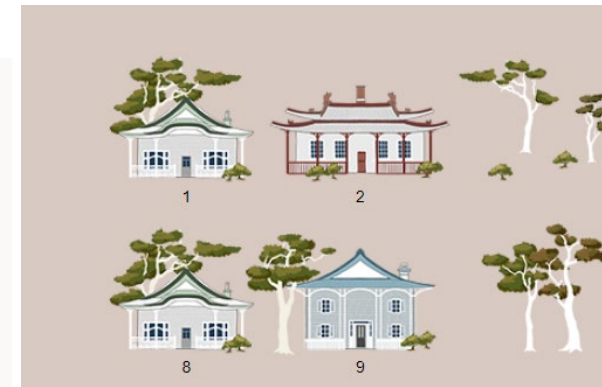
<https://islands.smp.uq.edu.au>

THE ISLANDS



Welcome to the home of the Islanders, a virtual human population that has been developed to support learning and teaching in experimental design, epidemiology and statistical reasoning.

The three Islands of Ironbard, Providence and Bonne Santé were settled by the survivors of simultaneous shipwrecks around 331 years ago. The initial settlements have grown and there are now twenty-seven villages with a combined population of over forty thousand Islanders for you to study. Login below to visit them.



About
Tasks
Chat

Summary
 73 years old
 \$393
 Lives in Hayarano 2

Children
[Katrina Reilly](#)
[Gaynor Reilly](#)

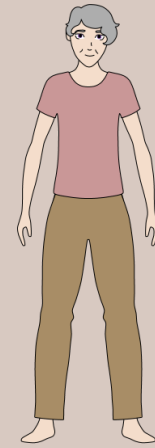
Contacts
[Add Sara](#)

Age 0
 01/259 Born in Lost Mountains

Age 41
 01/300 Arrived in Reading 636
 03/300 Friends with [Ikumi Hayashi](#)
 23/300 Friends with [Satonari Takagi](#)

Age 42
 02/301 Caught V1
 05/301 Friends with [Kuniko Kojima](#)

Age 43
 10/302 Friends with [Vasudha Lingutla](#)
 15/302 Friends with [Zachary Brown](#)



Bulmer M, Haladyn JK. Life on an Island: a Simulated Population to Support Student Projects in Statistics. Technology Innovations in Statistics Education;5(1). Available from: <https://escholarship.org/uc/item/2q0740hv>

The Islands is amazing... but

↪ Temporal dimension (evolving population)

- Geographical and contextual aspects not directly evident
- Population characteristics far from LMICs context
- Clinical/physiological variables prevalent
- True population values not directly accessible
- Non-modifiable population characteristics
- No tools for direct survey costing

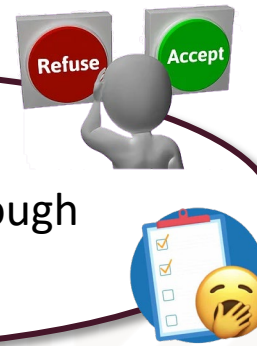
The SurveyLab

- Modifiable characteristics

- Code available for study and modifications



- ~ 40 000 individuals
- Realistic, complex enough
- LMIC -relevant



A **simulated human population** that can be **surveyed** and analysed by students in their research projects. This environment, remotely accessible through a **web interface**, will allow students to **design** their research project, **sample** the population according to their plan, and conduct virtual interviews to **collect the data** of interest that they can then analyse and interpret. All this in a reasonable amount of time, and in a safe and life-like, albeit simplified, environment.

- easy to use
- integrable in current LMSs

- open standards
- no proprietary formats/ technologies

- Client-server architecture
- Modular





INFORMATION TECHNOLOGY
service catalogue



NEW SOFTWARE
SOLUTIONS



Fund for Innovation and Research into Learning and Teaching (Finlo)

Population characteristics

Environment characteristics

Health/Disease mapping

Interface characteristics



AU Generate virtual population

AU Code backend server

IT Code Interface

AU IT Deploy and test

AU Evaluate

Welcome to SurveyLab

A virtual environment for learning survey methods

Click here to [sign in](#)

You don't have an account yet? [Register a new account](#)



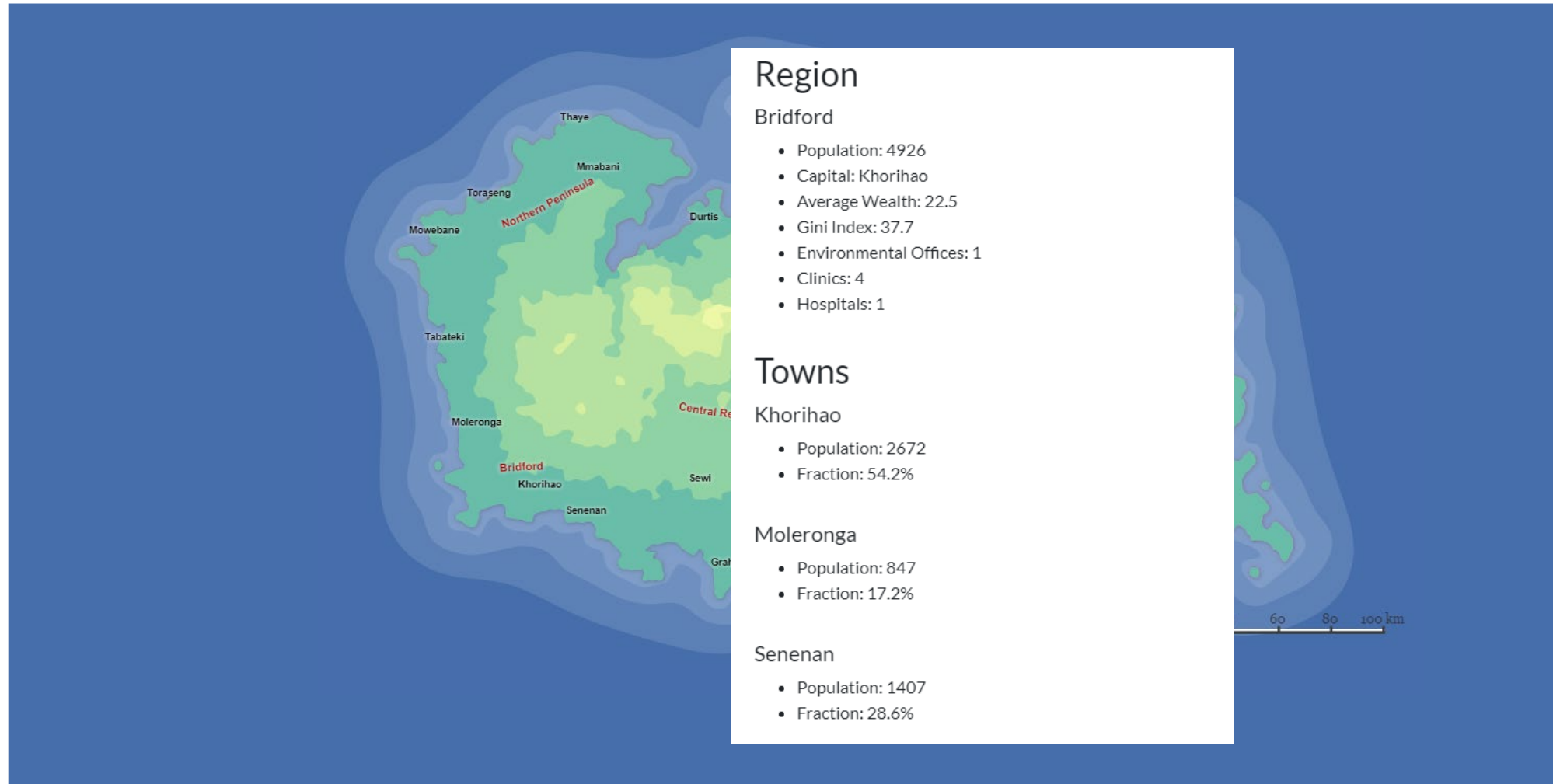
Welcome to SurveyLab

A virtual environment for learning survey methods

You are logged in as user "admin"



https://drive.google.com/file/d/18EdXEAC7_Wv51vCucYUByszCZjmtDTPr/view?usp=sharing

**Zoom**

Increase

Decrease

Reset

Show

Regions

Towns

Elevation

Rivers

Temperature

Reset

The SurveyLab world

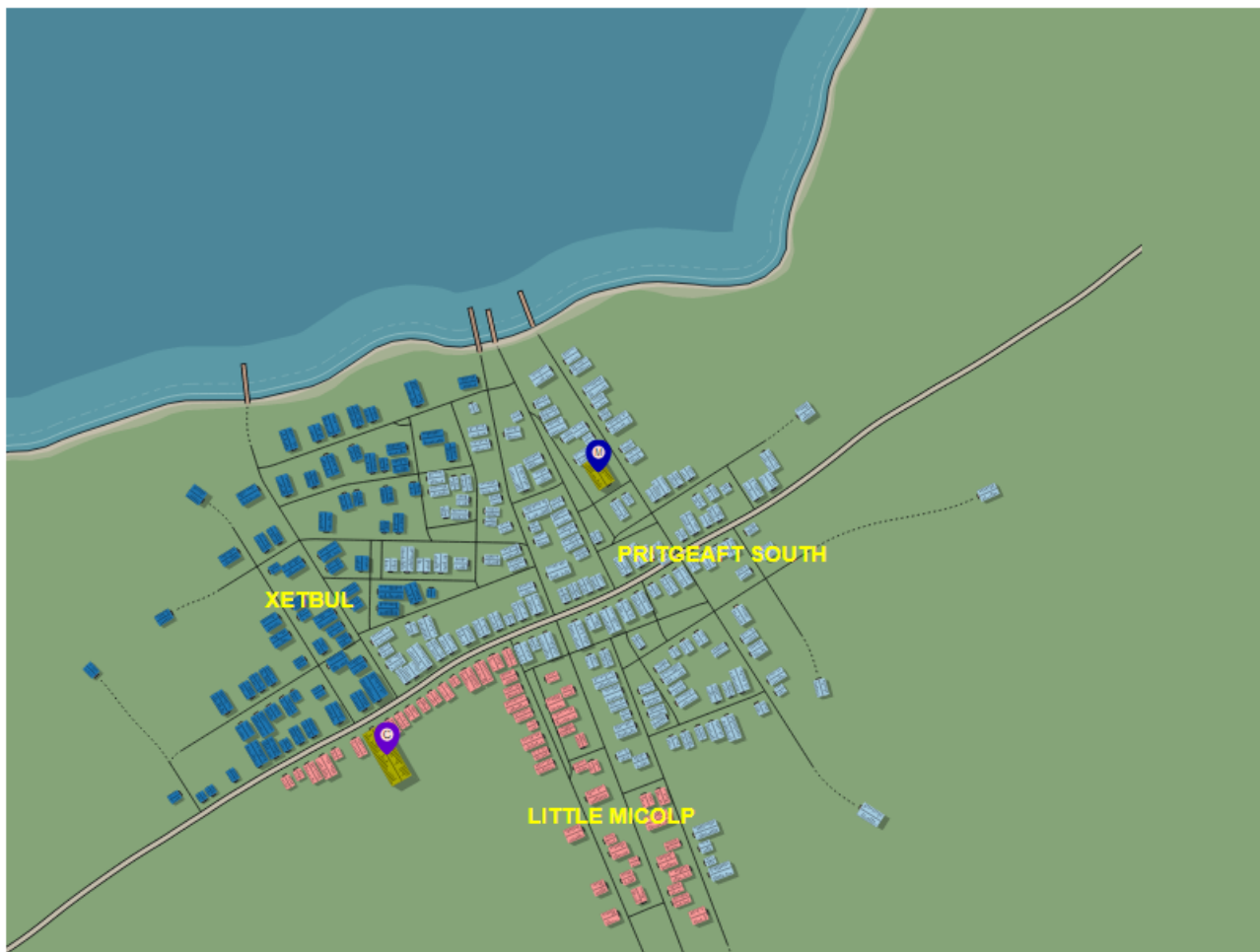
The SurveyLab world consist of 21 **Towns** over 5 different **Regions**, for a total population of about 40000 people. Each town has a **Municipal Office** and one or more **Health Facilities** (Clinics and Hospitals). The main Town in each region has also an **Environmental Health Office**. Towns are subdivided into **Suburbs**.

Aggregated information about the SurveyLab world and its population can be accessed by 'visiting' Municipal Offices, Health Facilities and Environmental Health Offices. They are indicated in the maps with these symbols:



Goritz

Region: **Beria**, Population: **980**



Zoom

Increase

Decrease

Reset

Back

Show

Suburbs

Public Buildings

Household
Numbers

Reset

The SurveyLab world

The SurveyLab world consist of 21 **Towns** over 5 different **Regions**, for a total population of about 40000 people. Each town has a **Municipal Office** and one or more **Health Facilities** (Clinics and Hospitals). The main Town in each region has also an **Environmental Health Office**. Towns are





Municipal Offices

Goritz

- Altitude: 700
- Population: 980
- Households: 289
- Capital: No
- Environmental Offices: 0
- Clinics: 1
- Hospitals: 0

- Average Wealth: 22 [WU]
- Gini Index: 36.9

- Lead Mines: 1
- Gold Mines: 0
- Power Stations: 1

▼ Suburbs

Cancel

OK



Clinics



Hospitals

MICOLP Clinic

Facility statistics

- Outpatients headcount: 34
- Doctors: 1
- Nurses: 5

- Antenatal Care: **Offered**
- Child Health: **Offered**
- HIV/AIDS/TB/STI: Not offered
- Chronic Diseases: **Offered**
- Trauma and Emergency services: **Offered**
- Oral Health: **Offered**
- Eye Care: **Offered**
- Surgery: Not offered
- Mental Health: Not offered

Cancel

OK

Questionnaires

Test 1 ▾

[+ Create a new Questionnaire](#)

Your tool

What type of energy/fuel does your household mainly use for cooking?

What is your sex?

Height [cm]

What is your age?

Weight [Kg]

Type of dwelling: formal or informal?

Questions

Type of dwelling

Do you usually live in this household?

What is the tenure status of your dwelling (Owned - not pay off, Owned - paid off, Rented, Occupied rent-free)?

What is the main source of drinking water for members of your household?

What kind of toilet facility do members of your household usually use?

How is the refuse or rubbish in this household mainly collected or removed?

Does this household have access to

Measurements

Size of the cuff used for BP measurement

Waist Circumference [cm]

Upper arm circumference [cm]

Haemoglobin [g/dl]

Systolic Blood Pressure, Reading 1 [mm Hg]

Diastolic Blood Pressure, Reading 1 [mm Hg]

Resting Heart Rate, Reading 1 [ppm]

Systolic Blood Pressure, Reading 2 [mm Hg]

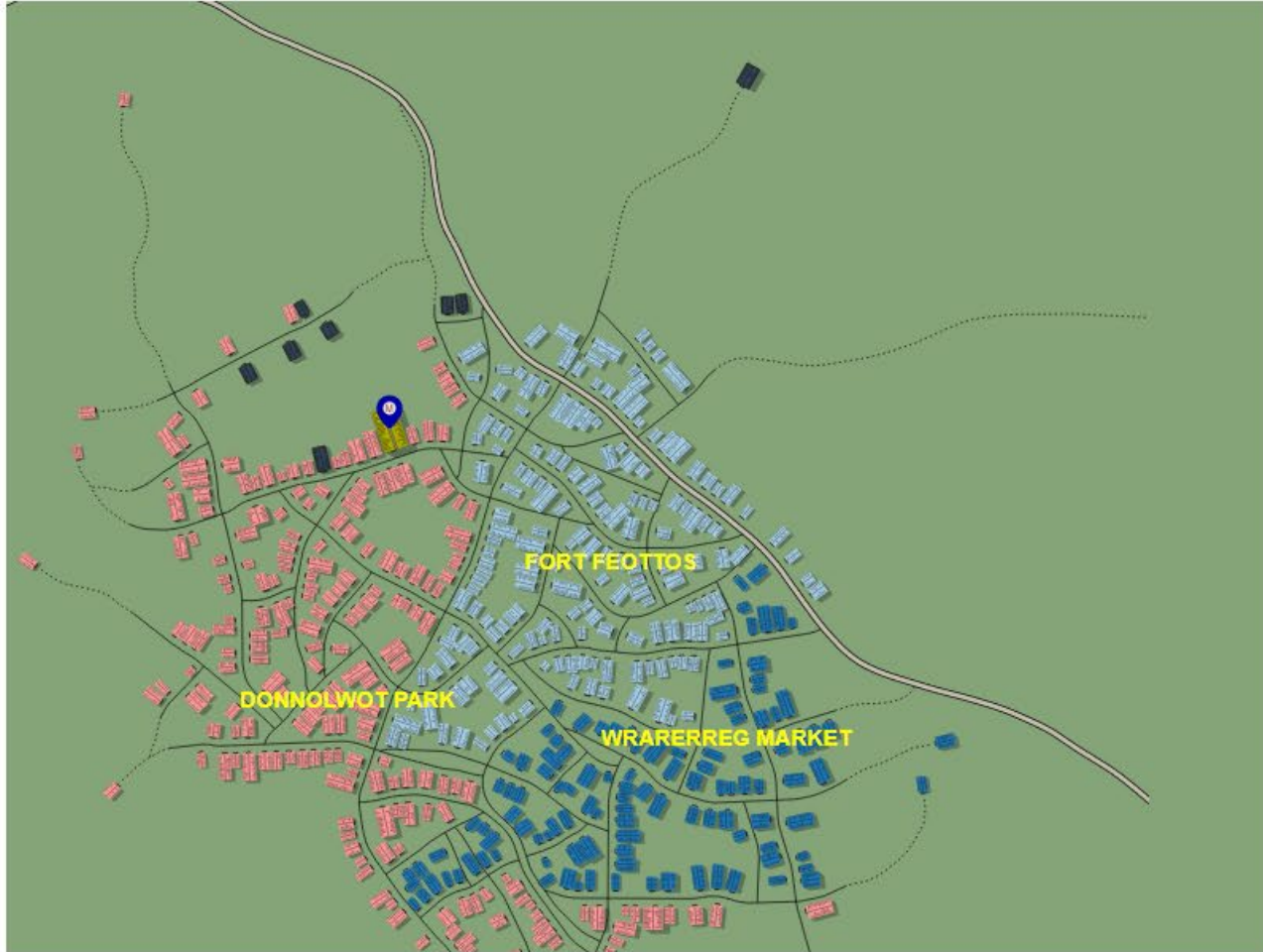
Save

Reset



Kasapa

Region: Beria, Population: 2407



Zoom

- Increase
- Decrease
- Reset
- Back

Show

- Suburbs
- Public Buildings
- Household Numbers
- Reset

Households

• H 4_23













Household
Numbers

Reset

Households

- H_4_23 
- H_4_44 
- H_4_45 
- H_4_308 
- H_4_331 
- H_4_327 
- H_4_333 
- H_4_325 

Sampling

When you **select a town**, you will be shown a street map with the position of each house. By clicking on a house, a list of the **component of the household** appears at the bottom, from which you can select your actual sample. Repeat the process if you want to add more towns.



Overview



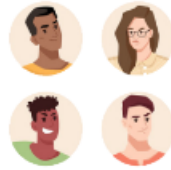
Data collection tool

Test 1 ▾

Number of questions 4

Number of measurements: 2

Administration time: 12



Sample

Number of towns: 3

Number of households: 11

Number of individuals: 41



Budget

Set up cost: 9

Collection cost: 0.7

Total cost: 9.7

Unit cost: 0.24

Survey

Choose your **data collection tool** among those you have previously saved, and click on the 'survey' button. When the system has completed the survey (the time needed depends on the sample size and the length of the questionnaire), you can **download the data** by clicking the "download" button



Households visited: 0%

Individuals interviewed: 0%

Download data

Download the data

Overview



Data collection tool

Test 1 ▾

Number of questions: 4

Number of measurements: 2

Administration time: 12



Sample

Number of towns: 3

Number of households: 11

Number of individuals: 41



Budget

Set up cost: 9

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Survey

Choose your **data collection tool** among those you have previously saved, and click on the 'survey' button. When the system has completed the survey (the time needed depends on the sample size and the length of the questionnaire), you can **download the data** by clicking the "download" button



SURVEY IN PROGRESS

Households visited: 73%

8

Individuals interviewed: 63%

26

Download data

Download the data



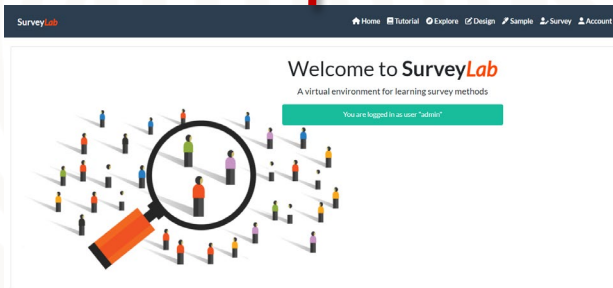
	A	B	C	D	E	F	G	H	I	J	K
1	IID	HID	HR	IR	HEIGHT	WEIGHT	ARMCIRC	SEX	AGE		
2	H_4_308_1	H_4_308	Consent	Refusal	null	null	null	null	null		
3	H_4_333_3	H_4_333	Consent	Consent	176.1	88.5	26.1	Male	32		
4	H_4_327_4	H_4_327	Consent	Consent	153.4	69.2	25.4	Female	62		
5	H_4_327_5	H_4_327	Consent	Consent	152.1	null	30.3	Female	16		
6	H_4_327_6	H_4_327	Consent	Consent	177.9	73.5	30.9	Male	35		
7	H_4_331_7	H_4_331	Consent	Consent	159	69.4	21	Male	null		
8	H_4_331_8	H_4_331	Consent	Consent	null	null	null	Male	14		
9	H_4_333_1	H_4_333	Consent	Consent	165.1	64.7	28.6	Female	78		
10	H_4_333_2	H_4_333	Consent	Consent	144.6	93.1	37.7	Female	25		
11	H_4_331_2	H_4_331	Consent	Consent	158	82.7	22.6	Female	72		
12	H_4_325_5	H_4_325	Consent	Consent	null	null	null	Male	5		
13	H_4_325_6	H_4_325	Consent	Consent	null	null	null	Male	10		
14	H_4_327_1	H_4_327	Consent	Consent	156.3	69.9	28.4	Male	43		
15	H_4_327_2	H_4_327	Consent	Refusal	null	null	null	null	null		
16	H_4_327_3	H_4_327	Consent	Consent	161	57.9	26.9	Male	15		
17	H_4_331_3	H_4_331	Consent	Consent	155.4	69.5	24.5	Female	46		
18	H_4_331_4	H_4_331	Consent	Consent	null	null	null	Female	3		
19	H_4_325_1	H_4_325	Consent	Consent	158.7	115.9	26	Female	55		
20	H_4_325_2	H_4_325	Consent	Consent	154.2	null	27.7	Female	29		
21	H_4_325_3	H_4_325	Consent	Consent	null	null	null	Female	14		
22	H_4_325_4	H_4_325	Consent	Consent	null	null	null	Male	10		
23	H_4_325_7	H_4_325	Consent	Consent	156.8	79.6	null	Female	54		
24	H_4_331_6	H_4_331	Consent	Consent	null	null	null	Female	4		

1.0 - Overview

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Academic Year 2022



- In-class exercises
- Assignments
- Focus-group discussion

- Invite to test
functionality, accessibility, ability to support students' learning

- RedCap® form

Adapted from: Anstey LM, Watson GPL. Rubric for eLearning Tool Evaluation. Centre for Teaching and Learning, Western University. Available at: <https://teaching.uwo.ca/pdf/elearning/Rubric-for-eLearning-Tool-Evaluation.pdf>.

In preparation for a large-scale national study, you have been asked by the Health Department to provide preliminary data on the **prevalence of COPD among the population 15 years and over, both in towns located in proximity of a power station and towns with no power stations in their territory.** The request also asks for **collecting information about potential confounders that can affect the comparisons in order to plan adequately for future study.**

As this is a preliminary study with a limited budget and a short time frame, the Department does not require a nationally representative sample, and you are allowed to **select purposely one town with power stations in their territory and one without.** **The level of precision** requested for the estimates is $\pm 5\%$, with a level of significance $\alpha = 0.05$. From studies in similar populations we expect a COPD prevalence of about 20%.

This is cross-sectional household survey conducted in two towns, Phane and Maunataue. These towns were purposely selected and households within each town were randomly selected to equally make up the sample size needed. One town was chosen with a power station (Maunatau) in their territory and the other town, Phane did not have a power station. Subjects aged 15 years and older were asked to participate in the survey.



Setup Cost: The cost will be influenced by the fact that two towns are going to be surveyed. This will include more people that is responsible for the survey and the training of the data collectors. To minimize cost, the towns that were in proximity were chosen. Systematic sampling was chosen due the cost-effectiveness of this strategy considering the limited budget.

Collection Cost: The survey included 4 questions and one measurement. With the inclusion of the measurement, it will increase cost as the time with each person will increase but will the reliability of the results will be better.

1. Response rate

All households and individuals selected for the current study were visited and interviewed. A total of two towns, Karigwa and Manuatau, were surveyed, with a total of 75 consenting households and 204 consenting individuals (>15 years old). The household response rate was 83,8% and 84,6%, and the individual response rate was 70,0% and 82,5% for Karigwa and Maunatua, respectively (see Table 1 and Figure 1).

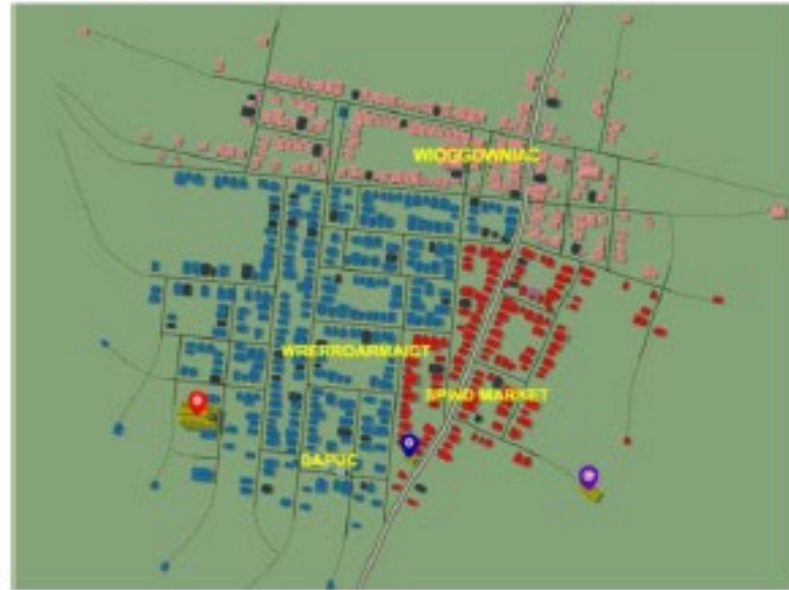
Sampling frame

Population over the 15 years old, living in Phane and Sewi. For this study disclosing age was important therefore participants who did not disclose age were eliminated from the study, including children with age under 15 years.

Figure 1: Sample. Households included in the current study (grey-out) based on random number generation.

Maunatau

Region: South East, Population: 2712



Karigwa

Region: South East, Population: 1547



what's next

- Hear feedback from evaluation: **improve usability**
- Finalise **tutorials** and **manuals**
- Implement a “**lecturer dashboard**” (retrieve ‘true’ population characteristics; modify individual propensities to refusals,...)
- Increase “**question pool**” and **population features** (individual and contextual)
- Implement individual ‘**deep interviews**’ (natural language interaction; interview context)
- Introduce **dynamic elements** in the population

Acknowledgments

Students of the Survey methods Module

Stacey Blows

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Vice-dean: Learning and Teaching

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Centre for Health Professions Education

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IT Institutional Software Solutions

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Senior Analyst Programmer
IT Institutional Software Solutions

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Thank You

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