

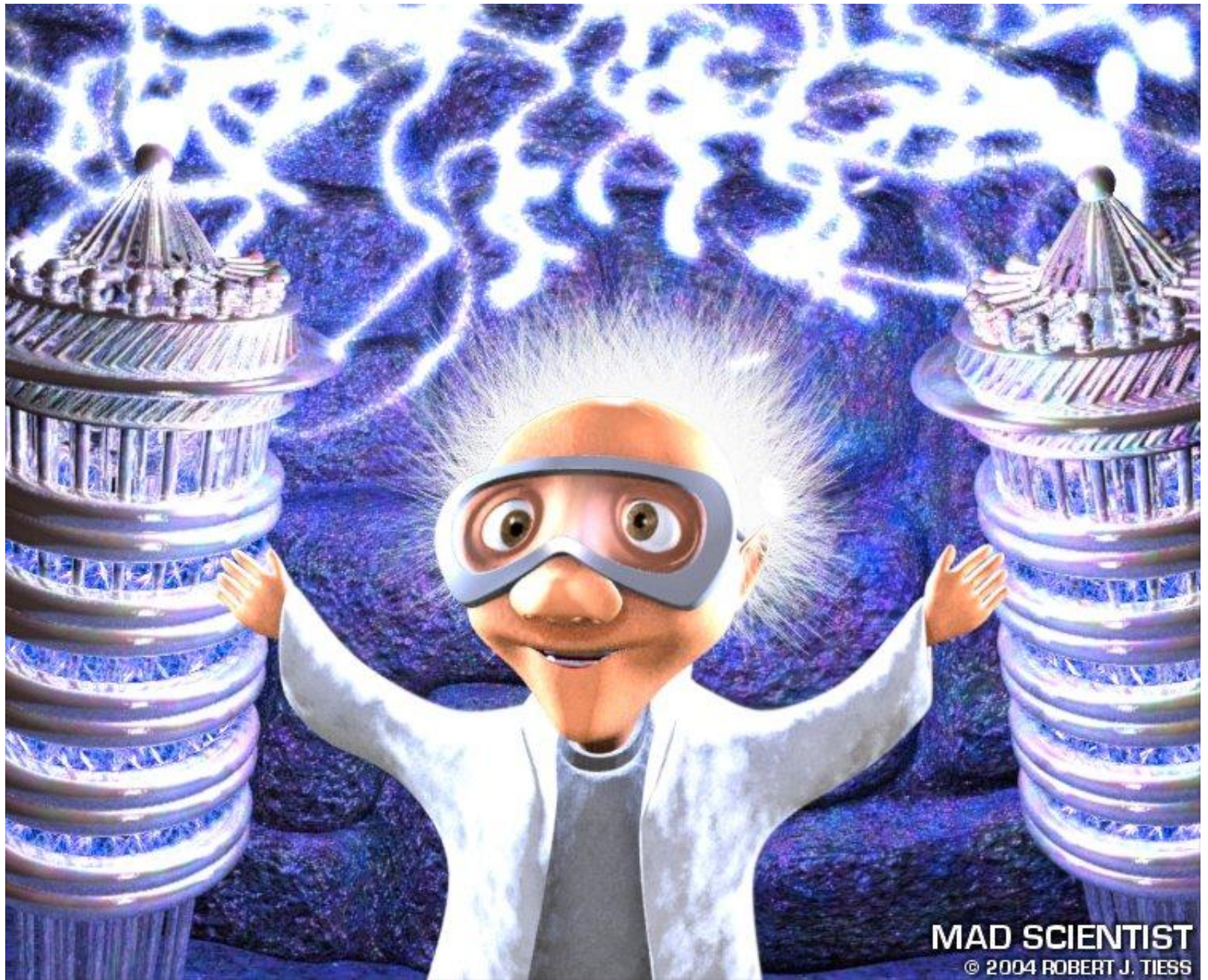


Formulating Hypotheses, Building Models, and Accounting for Variance

Professor Allen Hicken



معهد البحوث الاجتماعية والاقتصادية المسحية
Social & Economic Survey Research Institute



MAD SCIENTIST

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“The wrong view of science betrays itself in the craving to be right; for it is not his *possession* of knowledge, of irrefutable truth, that makes the man of science, but his persistent and recklessly critical *quest* for truth.”

Sir Karl Popper (2003 [1959]: 281)

Openness

Criticism

Scientific Method

1. Puzzle/Question
2. Theory/Model
3. Implications/Hypotheses
4. Observe the world (test hypotheses)
5. Evaluation

Scientific Method

1. Puzzle/Question

- ~~— Eureka!~~
- What? Why? How?
- Existing theories of how the world works

Scientific Method

1. Puzzle/Question
2. Theory/Model
 - Simplicity/Parsimony



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Al Shamal Rd

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Zekreet St

شارع الشمال

Arab League St

Qatar University
جامعة قطر

Student Housing Project

College of the North

Atlantic - Qatar

St 850

Al Jamia St

West Bay Lagoon

Katara Beach

Al Zaghwa St

Al Wadi Compound

Al Maszhabiliya St

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St 850

Al Duhail North

Al Duhail

Al Khafji St

Al Duhail South

Al Noor St

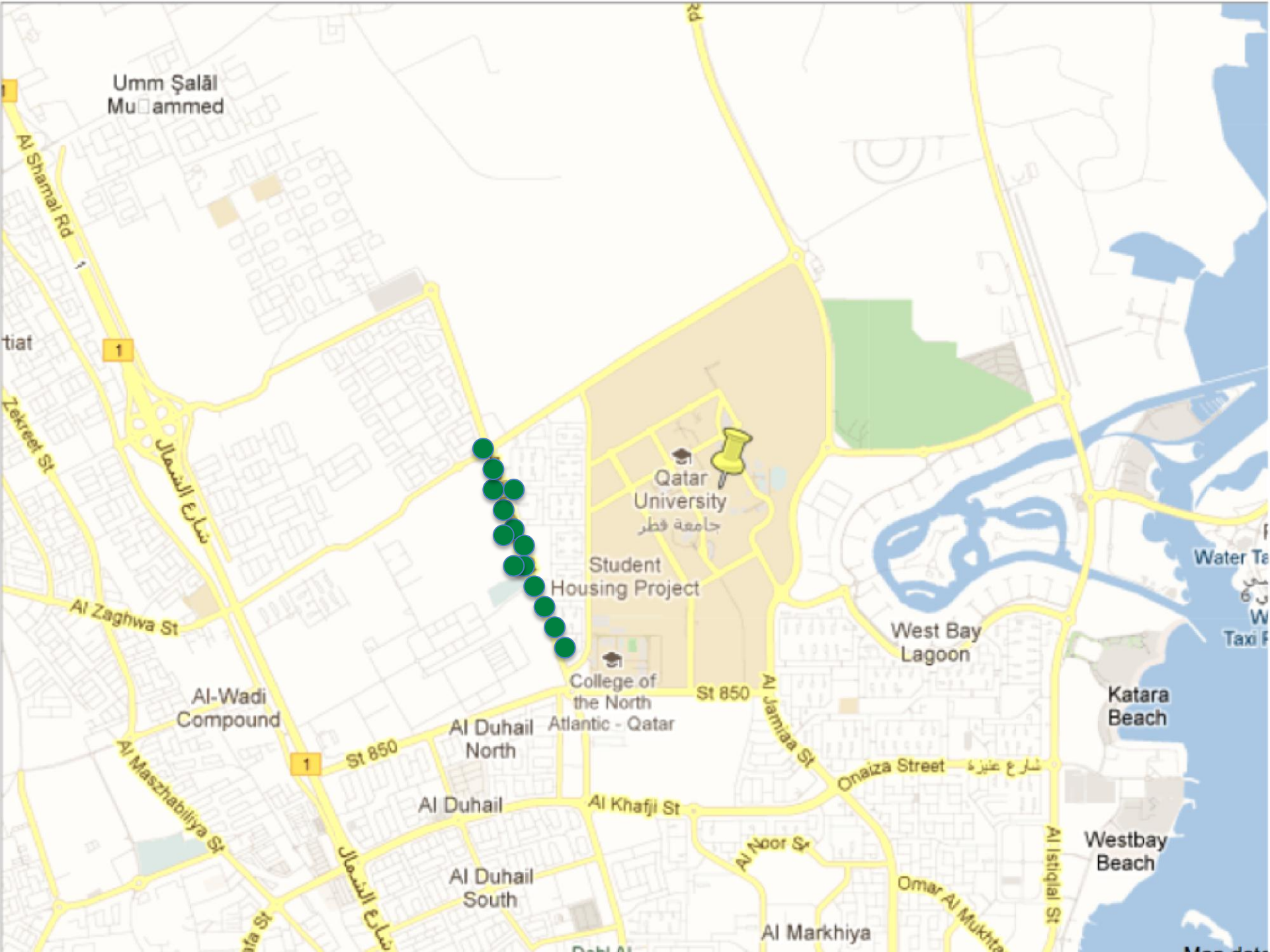
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شارع عذيرة

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Omar Al Mukhtar

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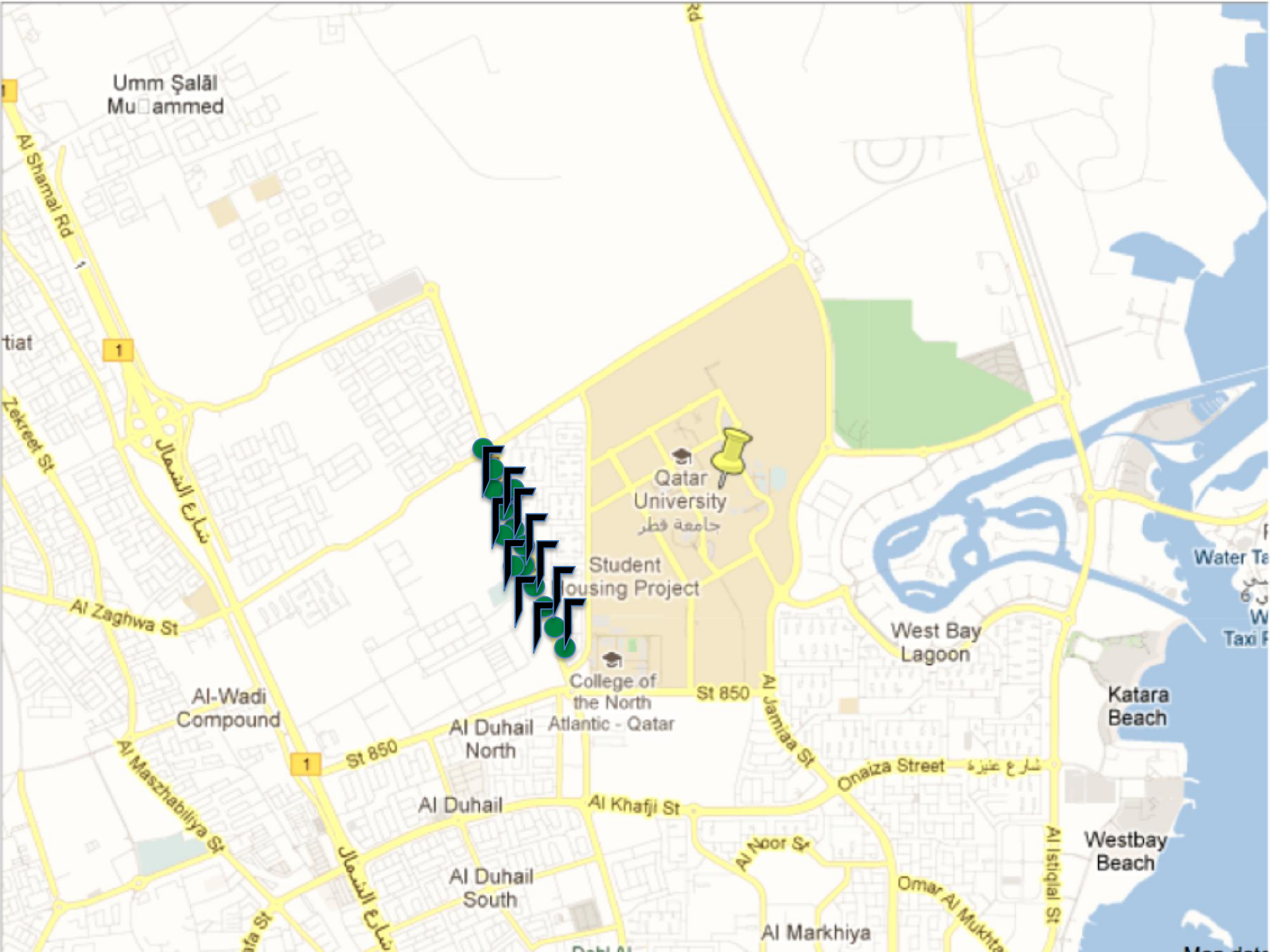
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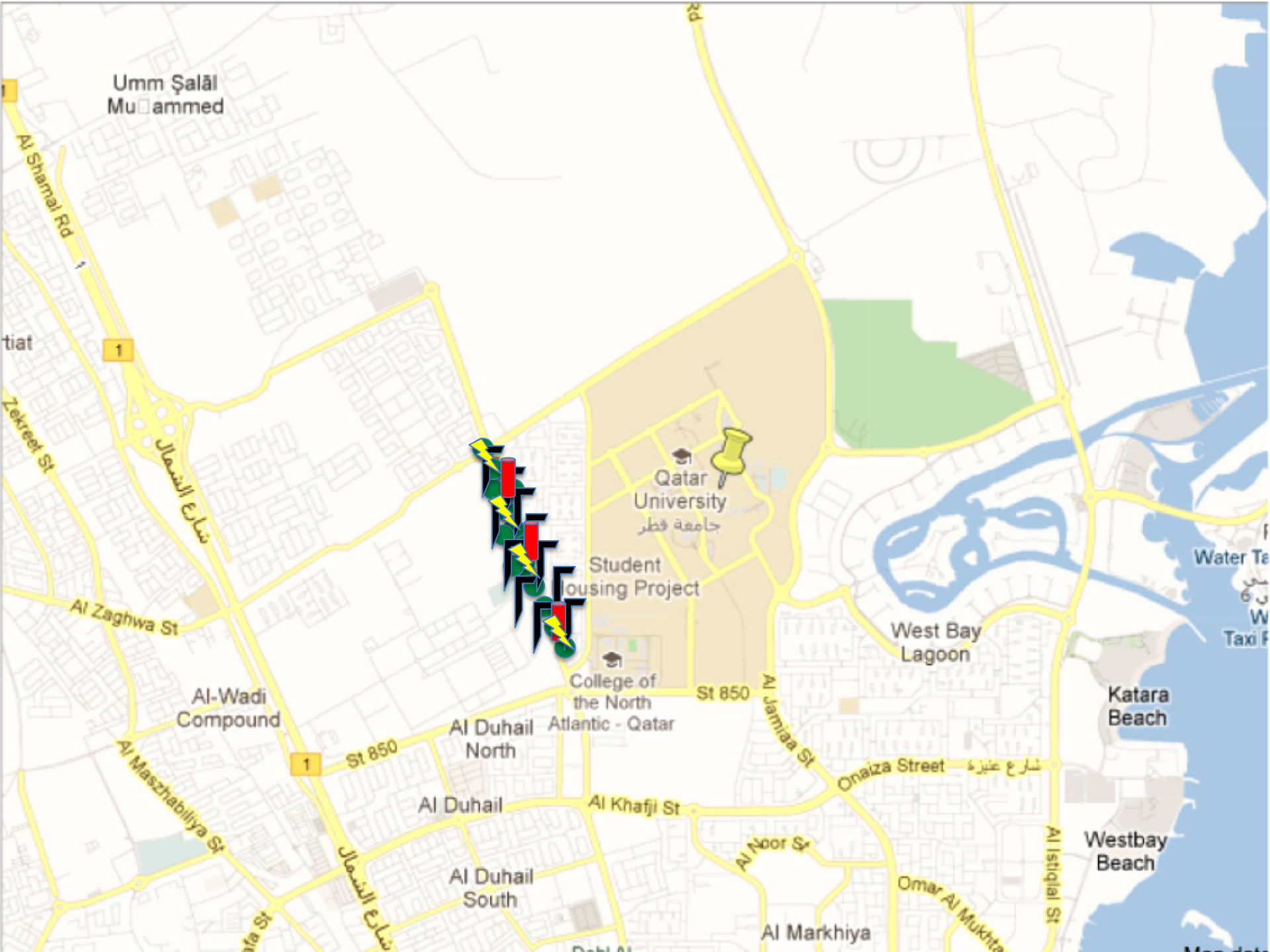
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Scientific Method

1. Puzzle/Question

2. Theory/Model

- Simplicity/Parsimony
- Predictive Accuracy
- Importance
 - Does it address a pressing problem?
 - How does it affect pre-existing theory?
 - Is it generalizable?

Scientific Method

1. Puzzle/Question
2. Theory/Model
3. Implications/Hypotheses
 - Implications of theory other than what we have already observed

Hypothesis Definition

- A testable statement about the empirical relationship between an independent and a dependent variable. (Pollock 2009)

Hypothesis Design

1: Identify both an independent (cause) and dependent (effect) variable

- Example: Some students perform better on exams than others
- Fix: Students who sit near the front of the class perform better on exams than students who sit near the back

Hypothesis Design

2: Make an explicit comparison

- Example: Rural residents are more likely to be religious
- Fix: Compared to residents in urban areas of the country rural residents are more likely to be religious

Hypothesis Design

3: State the nature of the relationship

- Example: In a comparison of countries, female education attainment and infant mortality are related
- Fix: In a comparison of countries, female education attainment is negatively related to infant mortality

Hypothesis Design

4: Be specific

- Example: Differences among immigrants account for different incomes.
- Fix: In a comparison of immigrants in Qatar, individuals with higher levels of English proficiency are likely to have higher incomes than those with lower levels of proficiency.

Hypothesis Design

5: Be sure it is testable/falsifiable

- Example: Strong states are able to overcome special interests in order to implement policies that are best for the nation
- Example: Those who value education are more likely to attend school.
- Fix: In a comparison of students in Qatar individuals with more positive attitudes about school perform better than those with negative attitudes.

Hypothesis Template

In a comparison of [units of analysis], those having [one value on the independent variable] will be more likely to have [one value on the dependent variable] than will those having [a different value on the independent variable].
(Pollock 2009)

Exercise I

- 1) Identify and describe at least one reason why each statement is a poor hypothesis. 2) Rewrite the statement as a proper hypothesis.
 - A. In a comparison of individuals, some people will be more likely to have served in the military than other people will
 - B. Decentralized workplaces have highly satisfied workers
 - C. Education and smoking are related
 - D. Some people support increased funding for religious education

Scientific Method

1. Puzzle/Question
2. Theory/Model
3. Implications/Hypotheses
4. **Observe the world (test hypotheses)**

Concept



Variable



Indicator



Operationalization

Defining Concepts

- Concepts
 - Must be concrete (measurable)
 - Must vary
- Conceptual Definition must communicate:
 1. The variation within a measurable characteristic or set of characteristics
 2. The subjects or groups to which the concept applies
 3. How the characteristic is to be measured

Defining Concepts

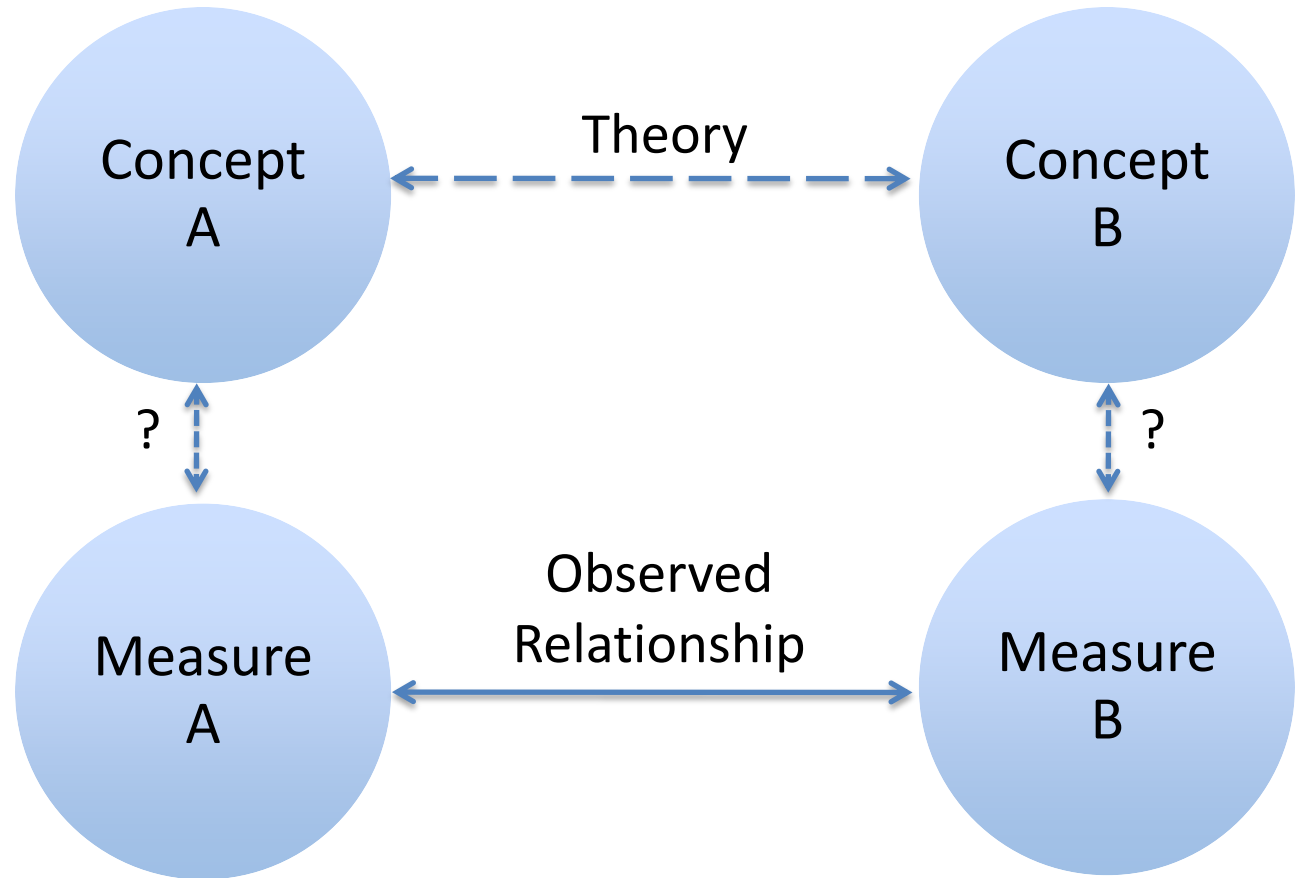
- Example

The concept of wealth is defined as...

- a person's yearly income
- a household's yearly income
- how rich a person is
- the number of household employees
- the number of household vehicles a household owns
- a household's lifestyle
- the number of residences a household owns

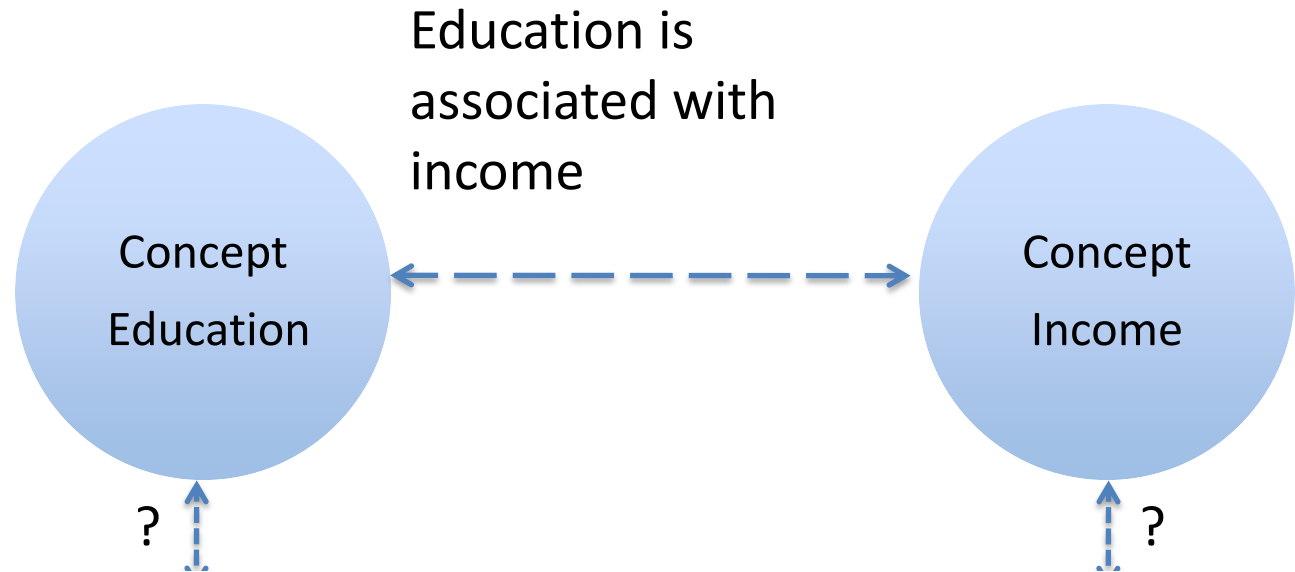
Problems of Measurement

1. Accuracy



Problems of Measurement

1. Accuracy



Exercise II

- Think about a possible relationship in your area of research.
 1. Write a testable hypothesis for this relationship
 2. How would you define your key concepts? (Write a conceptual definition for each)
 3. What are some measures you might use as a proxy for your concept?

Sources

- Clark, Golder and Golder. 2008. *Principles of Comparative Politics*. CQ Press.
- Philip H. Pollock III. 2009. *The Essentials of Political Analysis*. CQ Press.
- W. Philips Shively. *The Craft of Political Research*. Pearson Prentice Hall.