

Policymakers Workbench: A Knowledge-Based Decision Tool For Policy Makers

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Outline

- Motivating Example
- Policymakers' Workbench: A Model for Quality of Schooling (in Collaboration with Noel McGinn)
- A Model for Health
- Applications

Motivating Example

- In Peru only 59% of first grade students pass the reading test.
- Data shows that only 31% of students have textbooks and only 12% of schools have libraries.
- Should we provide textbooks to everyone?
- Should we build more libraries? OR,
- Should we spend our resources elsewhere?

Another Example

- In Yamen infant mortality is about 75 out of 1000 live births.
- In Yamen maternal mortality is about 430 out of 100,000 live births.
- Should we build more health centers in rural areas?
- Should we increase number of physicians? OR,
- Should we spend our resources elsewhere?

Our Approach to Policy Analysis

- Develop a diagnostic model of education quality and effectiveness.
- Identify major causes that make an education system ineffective.
- Link policy analysis to empirical research and field experience.
- We use Bayesian (or Belief) network modeling approach for integrating and synthesizing information from a variety of sources.

Other Model-Based Approaches

- Recent work on developing diagnostic models for economic growth.
- What are the binding constraints? What is the constraint with the most effect on economic growth? (Hausmann, et al., 2008).

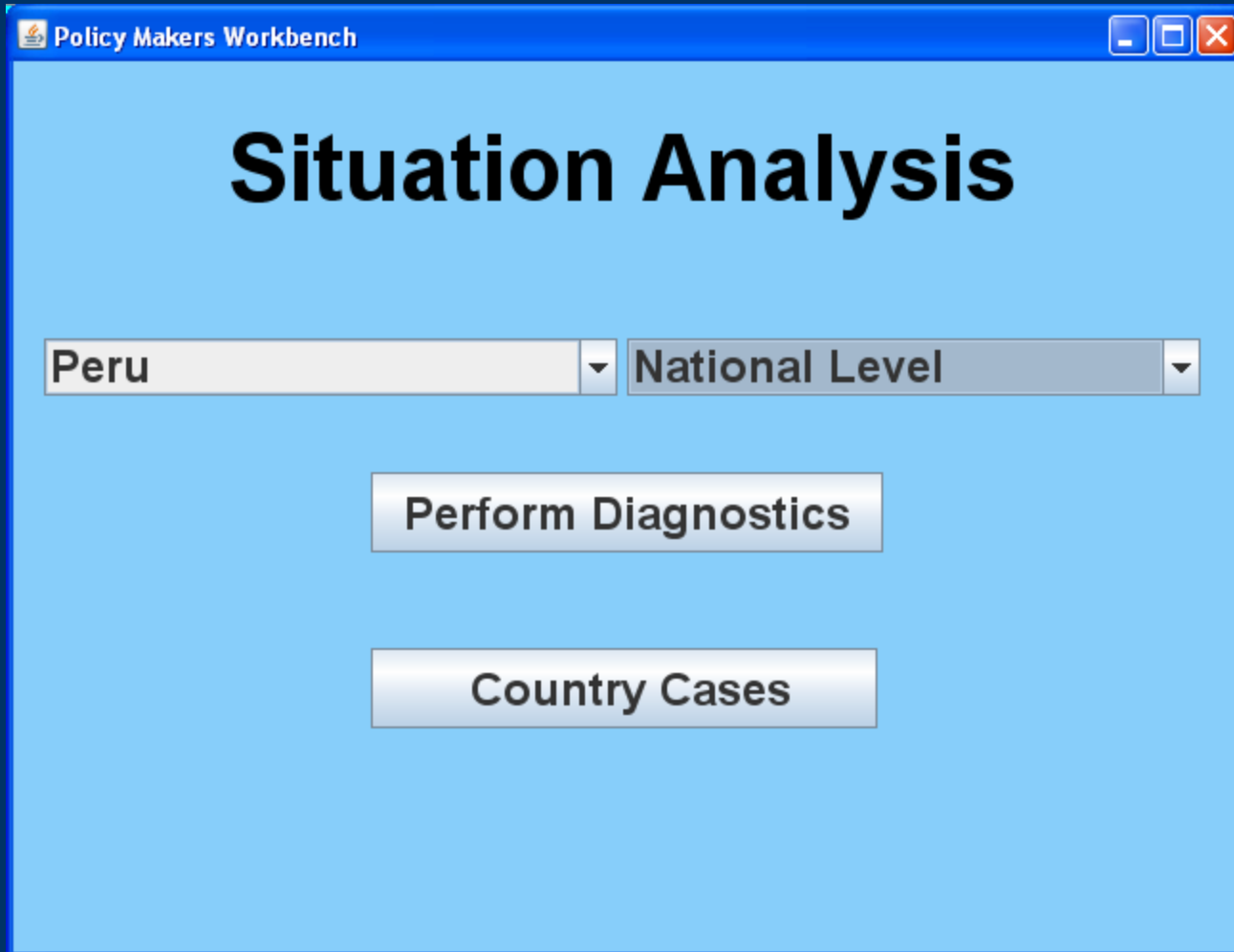
Analytic Tools for Policymakers in Developing Countries

- Develop tools to enable policy makers and local administrators to:
 - use their data, diagnose their problems, and evaluate competing policy options.
 - think through a policy implications by performing what-if analysis.

Three Kinds Of Questions

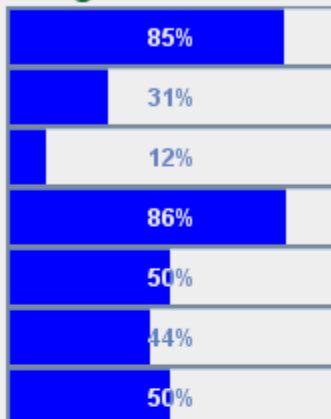
- Diagnostic Questions
 - *Why are test scores so low?*
 - *Why is student attendance low?*
- Decision Questions
 - *Should we reform teacher training programs?*
 - *Is it worth lengthening the school year?*
- Knowledge Questions
 - *What are the best ways to motivate teachers?*
 - *How did Korea reform its secondary education?*

Polycymakers' Workbench User Interface



School Organization Family Student Teachers

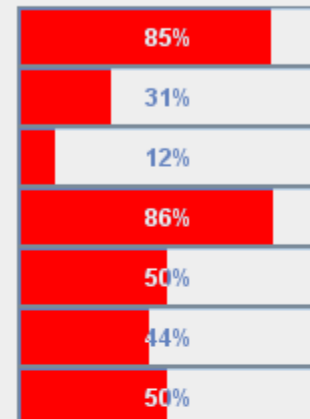
Original Values



Variable Name

PrincipalTrained
Textbooks
Library
DaysOpen
QualityInstMaterials
SchIFacilities
StudHomogeneity

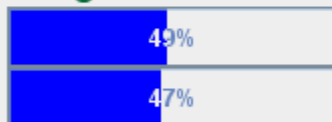
New Values



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Standard Outcomes **Intervening Outcomes** Sources of Problems Support Variables

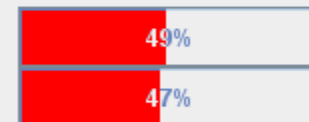
Original Values



Variable Name

Total Amount Learning Curric
Expected Reading Comp.

New Values



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Decision Making

Two distinct phases to decision making:

- An understanding of the problems and constraints.
- Deciding on a course of action.

Constructing a Knowledge-based Tool

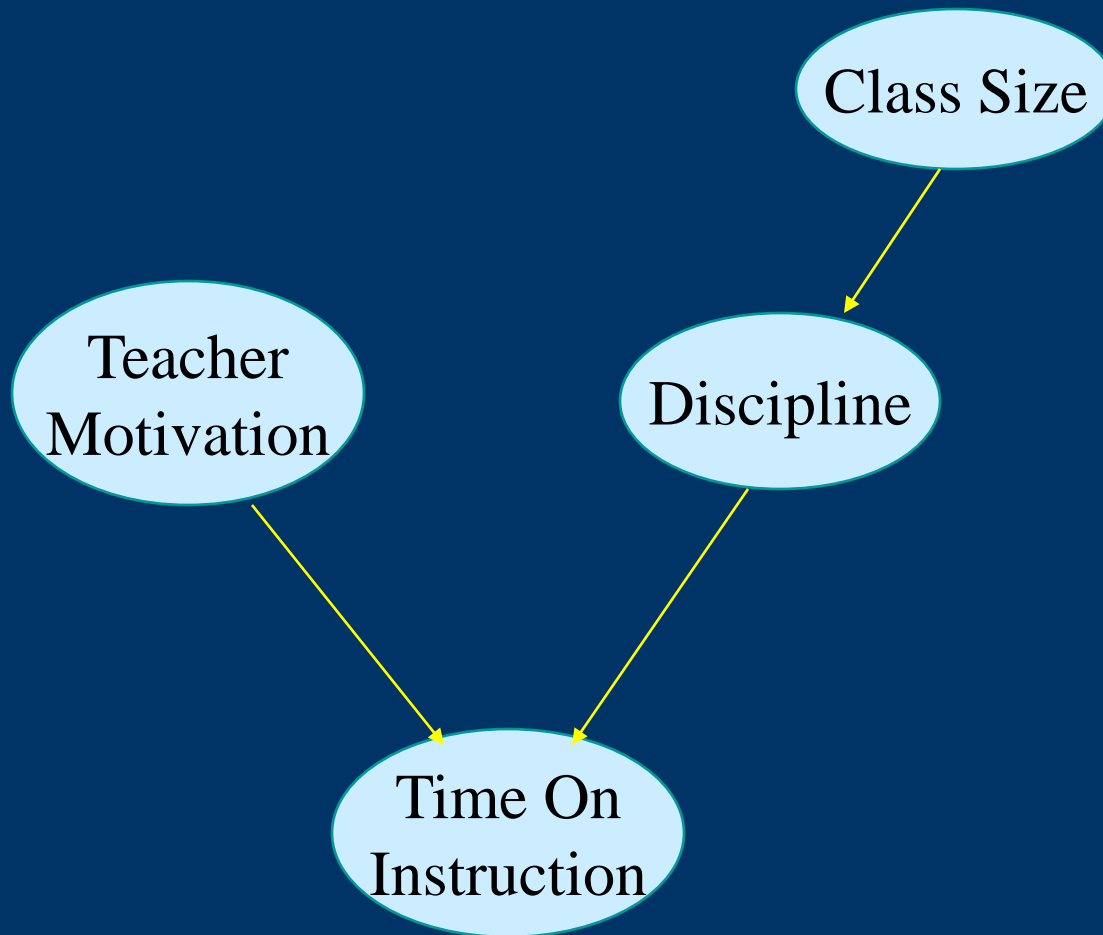
- Represent the empirical knowledge in terms of a causal model.
- Share the information through a dialogue.
- Help with the decision making through what-if scenarios.

Constructing the Model

An Example

Smaller classes have better discipline. The time spent on instruction is higher if the discipline is good and teachers are motivated. With more time on instruction learning is greater.

The Model for the Example



Belief (Bayesian) Networks

- A set of variables called nodes.
- A set of links or arrows connects pairs of nodes. Links represent (causal) relationship between variables.
- A set of probabilities that quantify the effect one variable on another.

Applications

These types of tools can be used as:

- A decision support tool.
- A learning tool for policymakers, school administrators, and other local officials in the country.
- A research tool to analyze data and various combinations of interventions.