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11.220 Quantitative Reasoning & Statistical Methods for Planners I
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Quantitative Reasoning and Statistical Methods (11.220)

Written Assignment #1: Operationalizing Planning Concepts

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Due: 2/27/09

1 The Problem of Measurement and Perception

In class and in the readings we have struggled with fact that the information used by planners, social science researchers, and policy-makers is not drawn from unbiased and naturally-occurring “data sources,” but rather comes into existence through conscious and deliberate acts of *measurement*. The world may be full of a staggering array of things and phenomena in various shapes, sizes, distributions, and relationships that can all be measured, but there is no single objective way to catalogue and categorize it all without introducing a whole host of assumptions, perspectives, and biases.

For the point of view of philosophy, this “problem of perception” presents one of the most sticky challenges of epistemology—a troubling issue that has never been satisfactorily resolved by the empiricists, despite some valiant attempts. For us, being more “realistic” in our approach, we can put aside some of the thornier philosophical concerns, but must still be aware of the choices we make, the tradeoffs we accept, and the biases we introduce when we proceed to measure and describe the physical, social, and economic phenomena of the world around us.

2 The Assignment

For this assignment you are being asked to address this problem head-on by turning a vaguely-specified and potentially-complex idea into a clearly-specified definition that can be measured, presented, discussed, and analyzed from a quantitative perspective. In social science research, this process is known as “operationalization.”

Working first as a group, and then alone, you will need to think about the concept which is to be measured, and confront the tradeoffs between different quantifiable definitions and measurement techniques.

2.1 The Concepts

Please choose *one* of the following to write on:

Density: Planners talk about density all the time: new urbanists promote it, zoning regulates it, developers crave it, community activists argue strongly for it or against it. Given all this activity—and despite the inherent quantitative nature of the idea—it remains a poorly operationalized concept. Imagine that you were hired by a nonprofit research and advocacy group interested in studying on the relationship between density and health at a neighborhood scale. They have a pretty good team working on the problem of measuring health, but have asked you to help operationalize the concept of *neighborhood density* for them. What would you include, and how would you measure it?

Neighborhood health: Health is a good thing, we all agree, but do we always agree on what we mean when we talk about health? Is there such a thing as “neighborhood” or “community” health, reflecting some amalgamation of the health of the individuals residing there? Imagine that you were hired by a nonprofit research and advocacy group interested in studying on the relationship between density and health at a neighborhood scale. They have a pretty good team working on the problem of measuring density, but have asked you to help operationalize the concept of *neighborhood health* for them. What would you include, and how would you measure it?

Financial need: In order to fairly allocate society’s limited resources, many social programs—including everything from welfare payments to public housing subsidies—attempt to target based on the concept of financial need. As you might expect, different programs measure the concept of “need” differently, based on their internal goals, the populations they serve, their biases about who is truly “needy,” and the administrative protocols and limitations of the agencies involved. Imagine that you have been asked to assist a small non-profit preschool in developing a workable definition for “financial need” to be used in allocating their limited funds for family scholarships. What would you include, and how would you measure it?

Cost of Damage: Later in the course we will talk about the role of planners and quantitative data in regard to questions of risk. One component of risk is probability, which we will cover in the weeks to come; another is cost. For example, in making plans to avoid a natural disaster (or to avoid *another* natural disaster), we may need to talk about the potential costs of damage if we fail to act. Quantifying the cost of damage from a disaster may at seem straightforward at first glance, but can very quickly become an intractable mess. For this assignment, imagine you have been asked to operationalize the concept of *cost* due to a natural disaster, to be used by researchers in a global study of the severity of different types of disasters over time.

Waste: These days, planners talk a lot about being smart, and a key part of being smart is not wasting stuff (money, land, energy, time, etc.). Everyone agrees that waste is a bad thing, but defining it can be quite tricky—is it wasteful to not take advantage of *every* possible efficiency, or is there some baseline that will keep you from being considered “wasteful”? For this assignment, imagine you have been hired by MIT to measure the Institute’s current level of “energy waste,” in an effort to ultimately measure progress towards eliminating it. How would you operationalize this concept for them?

2.2 Things to think about

Once you have selected a concept from the list above, you can work with your classmates to “flesh out” the issues; if done correctly, this collaborative process should actually make your job *harder*—not easier—as you will be forced to reconcile multiple perspectives and ideas about what is loaded into the particular concept in question.

We recommend you approach the assignment as you might approach any other typical planning problem: gather information and viewpoints, clarify goals, develop and evaluate alternatives, and then select a preferred option and explain why. You may work with others on all but the last of these steps (the final method for operationalizing the concept and the justification given should reflect your own thinking and work, not a consensus view).

In approaching this assignment, be sure to think about and address the following questions:

- Is it reliable? Will different observers all agree on how the concept is applied?
- Is it helpful? Does it distinguish between meaningful differences without exaggerating trivial ones?
- Is it fair? Does it introduce bias into the debate, rather than helping to clarify the situation?
- Is it scalable? Can it help measure the concept for planners concerned with crafting comparisons or interventions at different levels (individual, household, neighborhood, city, state, region, international), or would that require a different approach? (You may want to think about the question of the “granularity” of your measurements—remember to ask me about this in class.)
- Does it strike the right balance between a holistic approach and a reductionist one? Is it “too fuzzy” at the expense of being useful? Is it “too mechanical” at the expense of failing to capture what we actually care about?

- Is it valid? Are you actually measuring what you are hoping to measure? (Remember: a measurement can be perfectly accurate and reliable, but fail in terms of “concept validity”....)
- Is it workable? Will researchers or planners be able to actually obtain the information that you recommend?
- Is it straightforward and clear? Many statistically relevant indicators are simply too complex to be of much use in a policy arena. Will people understand what is being measured and how? How will you explain it in “layman’s terms”?
- What problems have you knowingly accepted? This assignment forces you to consider tradeoffs in the choices you make. Which ones have you struggled with, and how have you justified the decisions you have made?

2.3 Boring details

The paper should be as long as you need it to be, but 3-5 pages is a good guide. The paper is due no later than 4:00 PM on Friday, February 27, 2009 (though it might be nice to pass it in directly to your TA at your weekly section meeting).

3 Resources

In addition to the discussions we’ve had in class, you might want to pay special attention to the readings in chapter 2 of Meier et al. (2009) and the treatment of the indicators presented in Innis (1995) and Horwitz and Ferleger (1980).

No other outside reading is specifically required, but it would be wise to do some research on the quantitative aspects of the topic you have chosen.¹

References

- Lucy Horwitz and Lou Ferleger. *Statistics for Social Change*. South End Press, 1980. Required.
- Judith Innis. Sagas of three indicators. In *Knowledge and Public Policy: The Search for Meaningful Indicators*, chapter 6, pages 122–171. Transaction Publishers, 1995. In course reader.
- Kenneth J. Meier, Jeffrey L. Brudney, and John Bohte. *Applied Statistics for Public and Nonprofit Administration*. Thomson Wadsworth, 7th edition, 2009. Required.

¹Ideally you will chose a topic you know something about as well.