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MAKING *a* DIFFERENCE

MEASURING *the* IMPACT of INFORMATION *on* DEVELOPMENT

Proceedings of a workshop
held in Ottawa, Canada
10 - 12 July 1995



EDITED BY
Paul McConneil

INTERNATIONAL DEVELOPMENT RESEARCH CENTRE

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Measuring the Effects of Information on Development

Warren Thorngate¹

About a year ago, a colleague challenged me to learn something about measuring the effects of information on development by following the 28 participants of the Education Policy Analyst Workshop organized last August by Alfredo Rojas of REDUC (the Latin American Educational Information and Documentation Network) in Santiago, Chile.

I would like to discuss here something of what has become of its graduates, hoping to explicate what I think are some important methodological issues in the evaluation of information effects. By way of background, I am neither an information scientist, nor a librarian, nor a development expert. I am instead a social psychologist who teaches graduate courses in statistics and research methods and who has spent the last 25 years conducting research on the use of information in decision-making.

On the one hand, this background makes me rather different, and perhaps it should disqualify me from discussion of our listserv topic. On the other hand, the ideas of Martha Stone and of Michel Menou that have inspired our listserv seem, quintessentially, multidisciplinary. It may, therefore, do no harm to give a report from that perspective.

I think that Menou (1993)² noted the possible contributions of different disciplines in developing measures of the effects of information on international development somewhere toward the end of his book. So perhaps a psychological perspective on the use of information may complement your methodological work nicely. Yet different perspectives are not necessarily complementary. Often they conflict.

Possibly, what experimental and social psychologists know about information use may conflict with those viewing information as a commodity measurable by traditional means and amenable to classical statistical and

¹Professor, Psychology Department, Carleton University, Ottawa, Ontario, Canada K1S 5B6.

²Menou, M.J. 1993. Measuring the impact of information on development. International Development Research Centre (IDRC), Ottawa, Ontario, Canada.

cost-benefit analyses. So, to be true to my discipline and my intuition, I would like to express some doubts about the possibilities of evaluating the impact of information on development using the usual variations of evaluation methodologies, statistical procedures, and cost-benefit analyses, then propose a preferred alternative.

When I think of examining the effects of information on development, I think of how people seek and use information. It is a psychological perspective that seems to begin where libraries end. As it happens, psychologists know quite a lot about how people seek and use information. One of our own, Herb Simon, won a Nobel Prize in economics for his work on related issues (bounded rationality), much to the consternation of classical economists.

But psychologists are not alone. Sociologists know a lot about information use, as do those studying organizational behaviour and communication. There are journals full of the this kind of information including "Knowledge: Creation, Diffusion, and Utilization" (now called "Science Communication"), "Behavioral Decision Making," and "Organizational Behavior and Human Decision Processes."

I see few references, however, to research from the information sciences within their covers. Those of us who publish in these journals should know more about your research. Maybe it would be helpful if you know more about ours. I am one of those psychologists who is largely ignorant of the information sciences. But reading Michel Menou's book and following the ideas of our listserv, I sense that much of the discourse is predicated on assumptions about information use that psychologists and other social scientists know to be seriously flawed.

The assumptions I detect include the following:

- Information is that which reduces uncertainty (Shannon-Weaver definition);
- By reducing uncertainty we can better predict the consequences of our actions;
- Increasing our predictive accuracy will lead to increased benefits; and
- Thus, the net value of any information can be calculated by determining the increased benefits it leads to, minus the costs of obtaining, storing, and distributing it.

Mixed with such assumptions are an odd assortment of corollaries:

- The quality of information can be assessed by noting the amount of uncertainty it reduces,
- High-quality information reduces uncertainty more than low-quality information, and

- Thus, information quality may be equated with the quantity of uncertainty reduction.

Such assumptions and corollaries seem to be well-suited for the purposes for which they were originally designed, namely, the transmission of signals down a telephone wire. But they present us with an extremely limited idea of information. What is information? It is a question no less difficult to answer than "What is development?"

Each concept can be defined in many different ways. This circumstance presents us with the danger of choosing definitions easily adapted to our measurement and statistical techniques, rather than adapting our techniques to fit more defensible definitions.

Psychologists are no more able to define information than anyone else. But at least we can argue strongly what information is not. Information is not knowledge. We consider the former is what exists "out there" beyond our senses; it lives in nature, in print, on hard disks, in the air. Knowledge is that which exists "in here" behind our eyeballs, sitting just above uncertainty. There is no such thing as uncertainty "out there" — it is quite literally a figment of our imagination. We reduce it with knowledge, not with information. So psychologists are prone to be skeptical of measuring the effects of information on development, because we believe that it is more proper to evaluate the effects of knowledge on development.

To do so it is prudent to learn something of the relationship between information and knowledge. The relationship, unfortunately, is extremely complex. What do psychologists know about the complex relationship between information and knowledge? What does it imply for our own evaluative projects? Here are four of many things we know.

First, information, especially in its symbolic forms (including all research reports) cannot be used without prior knowledge. If I say to you, "*Khaste nabashed! Kaben ashghe man.*" I give you information that does not produce knowledge unless you know Farsi. If I mention the base-rate fallacy, it will mean nothing unless you know of the work of Tversky and Kahneman. Thus, an evaluation that shows no relation between information and development may only be showing a byproduct of insufficient prior knowledge. Increasing information may treat the symptom of ignorance rather than the disease.

Second, psychologists know that information affects the heart as much as the head. The classical notions of information listed earlier assume that information changes beliefs or the strength of association between ideas. They do not address the possibility that information can change values, priorities, goals, or evaluation criteria. Alfred North Whitehead made a useful distinction in judging

knowledge: we can judge it as true versus false, or we can judge it as important or trivial.

Information we can count and measure is generally information that separates the true from the false; it is the stuff of science and policy implementation. The information we cannot measure or count usually separates the important from the trivial; it is the stuff of art and policy formation. The former changes our beliefs about how to do something efficiently or well. The latter changes our values about doing it at all. We must not overlook the latter in our cost-benefit evaluations, understanding that values are affected by different information than are beliefs, and in different ways.

Third, decision-makers are usually quite bad at judging how they made decisions. Instead, they construct stories that make sense of what they did. Thus, it is foolhardy to trust the self-reports of decision-makers in determining how information affected their decisions.

Fourth, psychologists know that human decision-makers almost never behave like the prescriptive models of rationality derived from economics (including cost-benefit analyses) say they should. Let us be thankful, because most of the prescriptive models are either useless or dangerous.

The weaknesses of human decision-making are numerous and many are frightening. Decision-makers are prone, for example, to seek information in biased or irrational ways, ignore most of it, and change their preferences without notice. Dozens of such weaknesses have been christened with fancy names such as confirmatory bias, regression oversight, illusory correlation, dissonance reduction, and defensive avoidance. Coupled with a common lack of skill for finding relevant information, we often wonder how it is possible for decision-makers ever to make a good decision, much less to survive at all.

Of course, it was this fallibility that inspired mathematicians and economists such as von Neumann and Morgenstern to develop their calculi of choice. Only later did other mathematicians and economists demonstrate that the calculi had tragic flaws, illustrated by the St Petersburg Paradox or the Prisoner's, Commons, or Temporal Dilemmas. Economists who have tried to resolve these paradoxes and dilemmas have succeeded only in developing new calculi to prescribe alternative choices, and eventually in developing rationalizations for every possible prescription. This reduces rational choice to a choice of rationalization. Most good policymakers know it: "Get me some data that justify my decision!" Why not? Psychologists who have studied weakness of human decision-making have also developed great respect for its strengths.

We now know that it is at least as important for survival to create or recognize alternatives as it is to choose among them. Prescriptive models of

decision-making do not prescribe how to create or recognize alternatives. Humans do it anyway. We do it by extracting knowledge, insight, and understanding from information in new and unpredictable ways.

Therein lies a lesson for measuring the impact of information on development. Information has potential value as well as current value. But we cannot assess the potential of information by measuring information. We can only assess the potential by measuring the creativity of the people who use it.

Psychologists, like most other sentient beings, know that people seek and use information for many more reasons than improving their policies and decisions. We seek information for excitement and pleasure and the satisfaction of our curiosity. We use information to coordinate and justify our behaviours, to gain status and power, and to adapt to changes in our circumstances. We produce and consume information to maintain friendships, to resolve conflicts, to teach, and to learn.

I mention this only to remind those of us who are trying to assess the impact of various information services on economic or policy decision-making in developing countries that we are greatly restricting the range of our focus on the impact of information on development. The methods we develop may be well suited for the focus of our examination. But, the most important impacts of information on development may lie elsewhere, and we may be looking in the wrong place.

In sum, the main lessons from the psychological study of information and its uses are these: information is necessary but not sufficient for development, its effects are usually indirect and delayed, and it is never useful on its own. These conclusions may sound pedantic. But I think they have an important implication for approaching the task of measuring how information affects development.

The value of information cannot be meaningfully assessed outside the context of its use. It cannot be meaningfully estimated by including information as a variable in some linear equation or by "weighing" it in some additive fashion against the dollars spent on producing, distributing, storing, and retrieving it.

To assess the relative value of information against its funding competitors is like assessing the relative value of food versus water for human survival. Which is more valuable, food or water? It is a meaningless question. We must have both. The value of either depends on how much we need and want and have now and in the future.

So, are we wasting our time? Should we abandon attempts to assess the value of information and to measure its impact on development? It seems too foolish to abandon the idea of assessment. But, it does not seem foolish to abandon Shannon-Weaver and economic assumptions about information, to

abandon most of what we learn in those dry evaluation research books, and to change the rules of the game of cost-benefit analysis.

Psychology provides at least two different ways of looking at information that may be useful in setting or changing our course. The first is to put information and its uses in the broad context of human communication and the coordination of human activity rather than in the context of telephone communication, economics, or decision-making. In this context, information becomes the raw material of attitude change and social control, of rhetoric, and political action. In this context, it becomes as important to study advertisements and editorials as it is to study Internet traffic or library use. Indeed, in this context, money itself can be seen as a symbolic form of communication and lead us to compare money against other forms of communication for its ability to coordinate human action.

Second, psychology tells us that the true currency of information exchange is not money. The true currency is attention. Attention is literally what we "pay" for information, as we "spend" time to be informed. The exchange of attention for information forms the basis of an "attentional economy" that follows rather different principles than the monetary economy we know.

I have written at length about the principles of attentional economics and some of their implications. Suffice it to say, however, that the concept suggests that we might fruitfully evaluate the impact of information on development by considering how people spend their time before and after information is available, then examining how much time is "saved" for new or more rewarding activities as a result. If we want to return to the money game, we can then estimate the worth of that time and translate it into dollars.