Evaluation as a Cognitive Process

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Evaluation is one of a number of so-called 'higher order' cognitive processes that are involved in the brain's survival activities, including those extensions of basic coping processes (such as concept formation) that go into scientific and technological developments (like hypothesis testing). Some of these have been brought into various theories of learning and teaching. For example, in the (Benjamin) Bloom taxonomy, evaluation is listed as the intellectual activity at the top of the pyramid of skills at which teaching can be aimed. In this note, we'll look at some of the other cognitive processes that need to be distinguished from evaluation, and look at unpacking evaluation into some component processes. Doing this will help us avoid some confusions that hamper effective evaluation work, and also provide another kind of foundation for an epistemology and logic of evaluation.

The basic perspective here is that the animal brain is potentially drowning in an ocean of information. It is often suggested, although the calculations seem a little speculative, that the optic nerves alone could pass enough raw information to the human brain in a day (or at any rate, in a few days) to completely fill the brain's huge memory storage facilities. That would make it impossible to learn from subsequent experience since there would be nowhere to store the new knowledge. Worse, retrieval would be extremely slow, making response time to signs of danger hopelessly slow. Species survive because their eyes and brains evolve ruthless methods for filtering and storing the data flow, and for finding and replacing previously stored information. With some help from genetically carried templates, the brain—and its extensions in the eye—begins this process by developing concepts in terms of which it organizes the inflow, thereby vastly compressing what would otherwise be an unmanageable flood of data into packages with their own small labels. The packages—for example the multimedia package for mother—are recognized more or less instantly, and can be stored and retrieved economically and hence quickly.

The next step up from concept formation is generalization. Any regularities in the flow of conceptualized data are, in their turn, converted into economies in reception and retention. At the commonsense level, this translates into patterns which directly alter our responses and expectations, possibly named—for purposes of passing them on to children or peers—as saws or sayings like 'red sky at night, shepherds' delight'. A major function of science has been to extend our repertoire of these regularities, to which we give the grander title of laws of nature. One of the popular myths about science is that these are actually exceptionless statements, but in fact nearly all the usual examples—the gas laws, Hooke's Law, etc.—are simply crude approximations[1] (or quasi-definitional truths). Exact or not, they are infinitely more useful than randomness for

[1] See "The Key Property of Physical Laws—Inaccuracy" *Philosophical Studies*, or Nancy Cartwright's *Why the Laws of Nature Lie.*

organizing our thinking, our knowledge, and our predicting. So far, not too exciting; but the next step is quite interesting.

The next step up is, in formal terms, the theory; and in cognitive terms it is understanding or comprehension. The latter aspect of the phenomenon was much derided by the positivists, who saw it as part of the sin of 'psychologism'—substituting feelings for formal facts. But commonsense was not mocked; we all understand the 'Eureka' feeling when we get a grasp of a difficult concept, and it is the brain's sign that we have pulled off a gigantic step forward in the fight against the flood of information. For the comprehension, or the theory that formalizes it for the scientist, is a generator of generalizations, it is a meta-generalization. In fact, the commonsense of the matter is that in all but one in a million cases, what it generates is a pattern of expectations, constituting implicit knowledge—rather than literal generalizations, so the commonsense of the matter is a much more accurate rendering of what happens than the theory-creation account.[2] Now, what does all this have to do with evaluation? Well, gentle reader, has it ever occurred to you that the grade given by the instructor to the student at the end of a long interaction between them involving teaching and learning and testing and questioning is in fact an extraordinarily compressed representation of what is, for the registrar, the future employer, the parents, and other stakeholders, extremely important *information?* For all its faults,[3] it. like Boyle's Law, is an attempt at an invaluable summary of what the stakeholders really want to know, which is the answer to the question, How well did the student learn what was being taught in that course?

To put it bluntly, evaluations are simply a higher branch of the tree of solutions to the problem of trying not to drown in unprocessed information. They are the results of combining large quantities of empirical information with all relevant values, in order to go beyond an answer to the question, What's so?, to answer the questions, So what—and when, and to what extent, and for whom? And to answer it for people that don't want to know all the details, but need to have them in hand as a defense against possible challenge.

Evaluators often smile, or whine, about the fact that their clients usually only read the executive summary of their reports. But we all know there is often a good reason for this; the clients are drowning in the sea of information. They need the essence of it, and they need it to be reliable. They did (or approved) the work on finding a good evaluator, so they believe with some reason that the body of the report will in fact establish the results summarized in the exec summary. Reading it is, usually, not crucial for survival. Similarly, for admissions officers at colleges or graduate schools, or job gatekeepers at employers, the key information about one slice of the candidate's quality is the grade transcript.

So this note is just another way to put solid foundations under evaluation, to show how far from the truth was the view that evaluations have no place in science, which is concerned with real knowledge about the world, whereas evaluations are just expressions of personal preference. Of course, the people who were dismissing evaluation were also grading their students' work, and defending those grades with good reasons. It turns out that the latter practice was nearer to the truth than their voiced opinion about evaluation. At least, that's an idea to consider.

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[2] I have expressed some of this in what I called the 'comprehension theorem.'

[3] Attempts have been made to avoid grading, e.g., at the U of CA/Santa Cruz. These romantic excursions simply 'pass the buck' to those reading the lengthy essays they produced as a substitute; who, essentially, converted them immediately into grades.