

## Epistemology, Qualia, and CDM

Why people in many professions list the "things" in their work (events, objects, persons, etc.) on dynamic data tables they then model, like moist clay, to more fully engage their personal knowledge, goals, values, analytic skills, and imagination.

Epistemology, Qualia, and CDM are not terms used in everyday conversation. But together they validate a new type of software that enables an innovative thinking methodology. Understanding that validation leads to quicker understanding, and better use, of those PC programs. So let's look at epistemology, qualia, and CDM.

We like to know as much as we can about the details of our work. Epistemology is about that knowing. It is a philosophical matter and, because philosophy is subjective, one can take liberties (as I am) when addressing it. So epistemology is, in non-academic language, what knowing is and how we know—and how we know that 'what' and that 'how.'

We know with our minds. Consciously, sometimes subconsciously, our minds spontaneously search, select, gather, and link data. Unique meaningful aggregations of data in our working memory at any instant are, according to some, a series of distinct entities. Philosophers call them qualia. They are like snapshots, but are only concepts or states, not physical objects. Let me illustrate. Imagine you have stepped off a curb to cross a street, feeling entitled to go because the illuminated "Walk" light gave you permission. But you see a fast-moving truck approaching, and your knowledge and experience lead to a decision to run. You momentarily feel fear, replaced quickly by anger. All of that—facts, habits, and emotions—come together in a momentary 'quale', or state of thought and feelings. It is followed quickly by another—a series of qualia. Like separate frames in a movie film. There, persistence of vision allows our mind to blend each frame with the preceding image, and we interpret the result as unbroken motion. Walking further on the sidewalk, looking in store windows yields a series of very different qualia. There is no interpretation of the vastly different contents as unbroken motion, yet associations can occur. See an object in one window and you may recall, spontaneously, seeing in a previous store a similar but cheaper object. All of this is knowing, a dynamic process in which you are conscious of a series of qualia.

Those qualia, which are clearly subjective, exist in our working memory. We deal with the content of our working memory in a continuous process, reflecting on the changing content and acting on our reflections—which may then change the qualia in the working memory. That conceptual entity, in our working memory, has a corollary in the material world. Neuroscientists map the firing of neurons in our brains to locate where things take place. Some see a conceptual/physical model consisting of short memory and long term memory. Short term includes immediate memory, where data wait temporarily for acceptance by the working memory, the other part of memory short term. If not taken in, they disappear, like impatient diners who leave the entrance of a busy restaurant after a very brief wait. The content of the

immediate memory includes what is new from the outside —sensory input, i.e. what we see, hear, taste, smell, and feel.

Qualia in the working memory consist of much more than sensory input accepted from the immediate memory. Grabbed spontaneously are inputs from four parts of our long term memory. One, a collection from our experiences, is episodic memory. By definition, it is personal, subjective. Next is semantic memory, facts (probably objective) like knowing that Tashkent is the capital of Uzbekistan. Then there is procedural memory—how that person does things, perhaps subconsciously, like walking, or knowing the route to drive from A to B. Finally, there is emotion, another subjective and intensely personal set of attributes. The content of your working memory is described by words. So qualia comprise, primarily at least, language, i.e. words, text. So consider again the succession of store windows. Imagine you compose a data table that lists the objects in each and their characteristics (including store name). Do that for every store in town. Now consider the many ways the data can be selected and sorted (i.e. different column arrangements, or permutations). You may know exactly what you want, such as red skirts, priced under \$75, in stores that also have shoes. Or vacuum cleaners of certain brands and models in stores of particular names. It would be good to be able to do that selecting and sorting quickly, so that when your mind's reaction to a table's inclusion in a quale is a wish for another selection, or sorting, or both, the data table could be changed at once.

But life is full of surprises. Consider a hypothesis that intentionally looking at all possible permutations of a data table may disclose relationships you had not thought about, and could benefit from knowing. They may be unexpected problems you can act to mediate. Or they may be beneficial opportunities. Dealing with a data table that way seems logical, and logic is a part of studying knowledge, but how do you do it?

The answer is patented software inventions that allow an individual to quickly design a data table (select and sort) on one screen, with a click view the result on a second screen, return with a click to re-design the table (including different permutations, displayed automatically with one invention), and while viewing the table click a row to see the screen used to enter the data for that item (including, in addition to the data that appear on the table, a complete description of the item so the user has more item-specific information than the item's name). And closing that Item Specification displays the table again, automatically re-sorted according to the changed data. So with only 3 screens, the user models the data, takes it into his or her working memory, where it blends with a multiplicity of other data to form a series of qualia. Analysis and reasoning interact with the qualia, intuition considers a rich batch of information, imagination may jump in, and interactive modeling of the data continues spontaneously until all possible useful (in the user's mind) information has been extracted from the data.

Because that modeling, the human-computer interaction, occurs uniquely in the context of what is in the user's mind perceiving a lot of data about items on the table, similar to holding a jigsaw piece as you look at others on the table, we named it contextual data modeling, or CDM. We may easily understand what data modeling is, but without some understanding of the complex and wildly unpredictable context in which that occurs, you won't appreciate the modeling. Connecting the brain and the computer in this innovative fashion constitutes a powerful new way to analyze text data—about anything, in any profession.

We don't all see the same things when we look at a data table. And even if we did, our minds differ. Our interpretations of what we see may then, legitimately, vary greatly. The answers are not in the data table, they are in our separate minds. That is why we argue that a CDM program is the first software designed to more fully incorporate an individual's knowledge, experience, and skills in the analysis of data concerning her or his field of expertise. CDM does this two ways, which will have greater meaning to you having read this article. One, CDM lets a person build private datasets, rather than being limited to using those created by others. Two, focusing on qualia as the key entities in data analysis, an objective of CDM is minimizing the time required to revise the display of a data table in response to the user's current thinking.

Set aside the rationale for CDM now and try it. Model the sample data in Reason, then your own, until an "Aha!" reaction signals that your mind has intuitively grasped the potential of this important new tool for critical thinking.

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