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A Philosophical Framework for the Validation of Information Systems Concepts

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1. What does it mean to validate concepts?

2. What are the criteria?

Both philosophers and scientists have been unable to agree about the answers to these questions. [adapted from Shannon, 1975, p. 211].

The question of validating concepts and conceptual models has always been a troublesome and, at times, bewildering one for both philosophers and scientists in most disciplines. There is little agreement on the meaning of concepts, let alone their validity. Einstein had little evidence for supporting his conception of relativity when it was first proposed. In essence, conceptual development provides a means of crisply defining and elaborating ideas regarding certain phenomena.

The IS (Information Systems) field is faced with this difficulty more so than other social sciences because of its diverse constituents, ever-changing contextual environment (technology), and relatively short life span.

Rigby [1965, p. 16] correctly asserts that "the possibility of inventing concepts provides the opportunity for developing different ways for thinking about the same phenomenon... The phenomenon does not differ--only the way of thinking about it differs...The process of inventing concepts is an integral part in the growth and development of a discipline." A relatively new discipline such as IS (as compared to others in the social sciences such as Marketing) needs such invention of concepts for it to continue to evolve as a distinct field of endeavor. This can be better achieved if their is an understanding between all concerned about the means of developing concepts and building conceptual models that have validity.

Validation assures that a concept (or each construct in a conceptual model) contains the features imputed to it in their individual definitions/description. In other words, a valid concept implies that it is well-grounded, sound or capable of being justified. The response of an IS empiricist to the question "How do we validate?" could be a cynical retort -- design an experiment or build a prototype and test your concept or conceptual model. But, a fundamental problem with this approach, notwithstanding the assumptions inherent in statistical experimental design, is the presupposition of the "validity" of a concept or conceptual model. That is, a belief in the notion that mere definition implies that a concept has "face validity." If simply using a "term" made it acceptable to a discipline, one would never reach an agreement on commonly held truisms or knowledge of that discipline. This paradox and the absence of a such an organized basis for use by IS

researchers and philosophers in their scientific endeavors is key motivation for this article.

Therefore, this paper attempts to integrate notions from the philosophy of social sciences, the information systems (IS) field and its referent disciplines and sets forth a framework for the validation of IS concepts. The proposed philosophical framework for validation of concepts and conceptual models consists of a set of "criteria for validation" of concepts. As a concept satisfies each succeeding criteria its potential ability to have inherent "truth content" with regard to its general acceptance in the field strengthens. After all, "... concept formation and theory formation in science go hand in hand.... [T]he better our concepts, the better the theory we can formulate with them, and in turn, the better the concepts available for the next improved theory." [Paraphrased from Kaplan, 1964, p. 52-54].

Criteria for Validation of Concepts

1. Is it plausible (Plausibility)? A concept or conceptual model is plausible if it has face validity. This criterion is useful to assess the apparent reasonableness of an idea. This could be demonstrated by tautologous corroboration or deduction from past research or theories, or, it could be developed on the basis of observation or induction. Plausibility establishes that a concept or model is more than just a belief or conjecture.

2. Is it feasible (Feasibility)? This criterion dictates that a concept or conceptual model, at the least, has the quality of being workable or operationalizable. In addition to being plausible, a feasible concept or conceptual model would be operational in that it would be amenable to verbal, graphical, mathematical, illustrative, prototypical characterization.

3. Is effective (Effectiveness)? This criterion addresses the question: How effectively does the concept or conceptual model describe the phenomena under study? In addition an effective concept or conceptual model has the potential of serving our scientific purposes [Kaplan, 1964]. An effective concept not only represents the phenomenon in question parsimoniously, it also guides and stimulates other scientific inquiries.

4. Is it pragmatic? The pragmatism criterion dictates that a concept or conceptual model not be restrictive to the extent of logically excluding previously valid concepts or conceptual models. Thus, this criterion provides that concepts or conceptual models should subsume, for obviously practical reasons, any conceptual structures that previously explained related phenomenon. Hunt [1990] illustrates this criterion with the example of Newton's law. He argues that simple pragmatism would require that any new conceptual development could not preclude Newton's laws (as in the case of Relativity, where these laws are a special case subsumed within relativity). In effect this criterion emphasizes that concepts and conceptual models should have some degree of abstract, logical self-consistency or coherence with other concepts and conceptual models in the discipline.

5. Is it empirical? (Does it have empirical content?) Empirical content implies that a concept or conceptual model must be "empirically testability" [Hunt, 1990]. In this vein, Dewey also affirms that although concepts can be developed without reference to direct observation, and although this logical conceptual development is indispensable to the growth of science, the ultimate test of a concept or conceptual model lies in having the ability to empirically collect data to "corroborate" it. "Elaboration by reasoning may make a suggested idea very rich and very plausible, but it will not settle the validity of that idea" asserts Dewey [1933, p. 183].

6. Is it predictive? (Does it explain a phenomenon that is expected to occur?) The essence of this criterion is best described in the words of Rashevsky (1954, p. 152-3): "A theory or theoretical concept is considered the more convenient or useful, the better it enables us to **predict** facts that hitherto have not been observed... The scientist constructs theories, theoretical concepts or theoretical frames of reference that are isomorphic with the world of observable phenomena. This isomorphism is never complete, never covers the whole range of observable phenomena... wider the range of isomorphism, the greater predictive value of the theory." Thus, a concept or conceptual model that is predictive would, at the least, demonstrate that given certain antecedent conditions, the corresponding phenomena was somehow expected to occur [Hunt, 1990].

7. Is it intersubjectively certifiable? Hunt [1990], Nagel [1979], and others argue that all scientific knowledge, and in consequence, concepts or conceptual models "must be objective in the sense of being *intersubjectively certifiable*." This criterion provides that concepts or conceptual models must be "testable by different investigators (thus inter-subject)." Investigators with differing philosophical stance must be able to verify the imputed truth content of these concepts or conceptual structures through observation, logical evaluation, or experimentation.

8. Is it intermethodologically certifiable? In addition to being intersubjectively certifiable, this related criterion provides that investigators using different research methodologies must be able to test the veracity of the concept or conceptual model and predict the occurrence of the same phenomenon.

With regard to the above criteria for validation of concepts and conceptual models, one example in the IS field comes to mind: the work of Davis [1989] and Davis et al. [1989] relating to the development of the technology acceptance model (TAM) and the conceptualization of "perceived usefulness and ease of use" based upon *a priori* research and theories from diverse disciplines. Davis and associates demonstrated a linkage between perceived usefulness and perceived ease of use, and user's attitudes, intentions and actual computer adoption behavior. Furthermore, Szajna's [1994] positive assessment of the predictability of Davis' [1989] technology acceptance model in an software choice situation exemplifies intersubjective certifiability of the TAM and the associated concepts of perceived usefulness/ease of use. Thus a concept or conceptual model that is plausible, feasible, effective, empirical, pragmatic, predictive, and, replicable (intersubjectively and intermethodologically certifiable) is more likely to be imputed with the same meaning to

different investigators, conform to observable phenomena, and capable of explaining and predicting phenomena.

In conclusion, it must be reiterated that having a unifying basis for validating IS concepts and encouraging concept creation is potentially the only way of achieving a stream of thought that is coherent and consistent, and which truly follows the scientific method. Once again in the words of Dewey [1933] "conceptions are standards of reference... concepts enable us to generalize, to extend and carry over our understanding from one thing to another" [p. 149-50] and "... conceptions are the intellectual instrumentalities that are brought to bear upon the material of sense perception and of recollection in order to clarify the obscure, to bring order into seeming conflict, and unity into the fragmentary" (p. 179). But, in order for such a concept to be "generally" applicable and accepted it must be valid. By no means is the list of criteria discussed here meant to be prescriptive or exhaustive; but, they do serve as a minimum set of desirable qualities of valid concepts.

"When I use a word," Humpty Dumpty said, in a rather scornful tone, "it means just what I choose it to mean--neither more nor less."

"The question is," said Alice, "whether you can make words mean so many different things."

"The question is," said Humpty Dumpty, "which is to be master--that's all." [Lewis Carroll in Alice in Wonderland].

References

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Additional references are available upon request from author.