

# Generalized Research Canons for JTB(+) Knowledge

Van Brewer  
Senior Operational Manager  
Computer Sciences Corporation  
van.e.brewer@gmail.com

Andrés Sousa-Poza, Ph.D.  
Associate Professor  
Department of Engineering Management and Systems Engineering  
Old Dominion University  
asousapo@odu.edu

**Abstract:** Multi-disciplinary research may encompass studies based on differing ontological and epistemological underpinnings. This presents a difficulty resolving knowledge claims, as research canons founded in different philosophical perspectives may not be reconcilable. Since the goal of any set of research canons is to build knowledge, a particular definition of knowledge – that of a Justified True Belief with conditions - is used to derive a set of generalized research canons. These generalized canons are applied to illustrative philosophies to instantiate sets of internally consistent research canons, which are applied to a specific area of study (complex situations) for illustration.

**Keywords:** Research Canons, Knowledge, Justified True Belief, Empiricism, Rationalism, Pragmatic Idealism

## 1. Introduction

The purpose of research is to gain knowledge. Credible research requires rigorous consideration of what knowledge is and how it can be gained, expressed as canons for research. Though canons may vary across particular research communities, the purpose remains the same: to ensure knowledge is developed in a defensible manner. This defense must necessarily include ontological considerations of the nature of being; there is something to be known and there is someone to know it. Since knowing itself is an epistemological statement, research canons must possess an epistemological and ontological perspective. For research in areas with different philosophical perspectives, the duality present in various branches of philosophy (positivism / constructivism, rationalism / empiricism, etc.) may demand choices that will preclude building some forms of knowledge and enable building others. The choice of canons becomes critical for the researcher in areas sensitive to such variations in perspective; but for multi-disciplinary research considerations of canons and reconciliation of potential dichotomies in resulting knowledge claims becomes both paramount and problematic.

Rather than building canons on disparate foundational philosophical perspectives, they can be constructed on a

common element for reconciliation – knowledge – to yield a set of “generalized research canons” based on a specific definition of knowledge. These generalized canons, applied to a particular philosophical perspective, instantiate a specific set of research canons; allowing resulting knowledge claims, even though derived from potentially irreconcilable philosophical perspectives, to retain common reference points for reconciliation.

## 2. Research Canons

A canon is “a general rule, fundamental principle, aphorism, or axiom governing the systematic or scientific treatment of a subject” [1]. Canons are presented in the literature on research methods, sometimes as rules [2] or procedures [3]. They are developed within specific disciplines to meet the particular requirements of the discipline; a treatment of canons for qualitative research [4], [5], quantitative or mixed methods [6] yields different results. The common end state is a set of guidelines, procedures and rules for the conduct of credible research within the discipline.

A point – perhaps too obvious for mention – that is not emphasized in these treatments is the end state of research itself. In the above definition for canons, the notion of “scientific” as “producing knowledge” [1] is illustrative – the end state of research is to build knowledge, accompanied by concomitant epistemological and ontological issues. Canons evolved within a given discipline to enable credible research, and in doing so they necessarily instantiated a philosophical perspective appropriate to that discipline. This also implies the existence of an unstated canon common to all instances: that of internal consistency with philosophical foundations. However, the philosophical foundations for canons are not explicitly addressed in the literature (with some exceptions).

Bozkurt [7] provides a review and analysis of research canons which, in addition to asserting the requirement for internal consistency with underlying philosophy, generates generalized canons for the dualistic perspectives of positivism and constructivism (Table 1). These incorporate

considerations of other categories of canons, such as [8] and [9].

Positivist	Constructivist
Internal Validity	Credibility
Generalizability	Transferability
Reliability	Dependability
Objectivity	Confirmability

Table 1. Research Canons (from Bozkurt [7])

Other sets of canons can be grouped (subject to debate and discourse) within these categories; Table 2 provides an illustrative grouping of rules from [4] within this framework.

Bozkurt [7]		Illustrative Comparison to King et al [4]
Positivist	Constructivist	
Internal Validity	Credibility	Logical Consistency Conditional Independence I (independent explanatory variables) Leverage (explain as much as possible with as little as possible)
Generalizability	Transferability	Relevance I (real-world) Relevance II (scholarly) Omitted variable bias (did you capture all that matters?) Efficiency (did you ignore that which does not?) Indeterminacy I: Sufficient cases Indeterminacy II: Single explanatory variable
Reliability	Dependability	Unit homogeneity (consistency within cases or samples) Conditional independence II (cases really are independent) Selection Bias Validity of data collection Reliability of data collection: Used accepted surveys. Replicability of data collection: Used accepted surveys. Level of generality Blindness (do not use old data to test old theories)
Objectivity	Confirmability	Testability Falsifiability Summarize data with focus on outcome Honesty (report weakness in case selection biases, etc) Honesty (report measurement errors)

Table 2. King et al (1994) Canons Mapped to Bozkurt (2005) Categories

However, the categories in Bozkurt [7] were derived by abstracting common themes in existing sets of canons; so the ability to place another set of canons within those categories only serves to illustrate that a higher level of abstraction is possible. This is the case illustrated in Figure 1, where the

explicit or implicit philosophical foundations are the basis for building knowledge – which then leads to difficulties in resolving knowledge claims across different philosophical foundations.

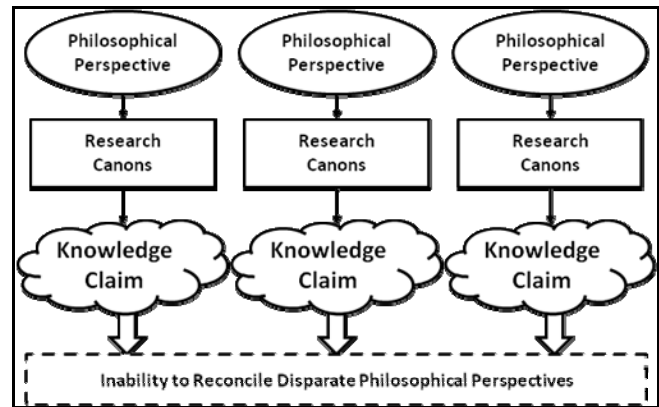


Figure 1. Application of Research Canons

Also, though the incorporation of philosophical perspectives addresses the axiological principle of internal consistency, it does not address canons as a means to accomplish the fundamental goal of research – building knowledge. The first step in this process, then, is to define knowledge.

### 3. Knowledge

The definition of knowledge is both an ancient and ongoing discussion in the literature, warranting its own branch of philosophy (epistemology). The intent here is not to repeat this rich discussion, but instead to accept the generally held Platonic definition – and therefore accept the debate and limitations associated with that definition. As will be seen, even this approach requires accepting some initial choices to enable application of the definition.

The Platonic definition of knowledge is belief with some account [10], generally referred to as a Justified True Belief (JTB). Gettier [11] demonstrated that issues arise with the reliability of justification. This is further discussed in Lehrer and Paxson [12], who assert that the JTB must be undefeated, and Goldman [13], who asserts that the JTB must be causal. These discussions, and others, are generally applied to create a definition of JTB(+), where the “(+)” indicates additional criteria to address Gettier conditions. In order to develop a suitable foundational definition of knowledge, the “(+)” must be rendered into a suitable form for discussion.

A basic lexicon can be established to develop the JTB(+) construct, starting with the notion of belief. The inclusion of the qualifier “true belief” belies that an individual can have “beliefs” that may or may not be true; here referred to as “ideas” in the sense of “mental image, conception, notion” [1]. A belief then becomes an idea held by an individual to

be true – either a reflection of reality in terms of direct correspondence with reality or a true reflection of reality in terms of coherence with a set of propositions related to reality. The establishment of the truth of this belief for the individual then constitutes that individual’s justification – in other words, “justified” implies the assertion that an individual’s true belief can be communicated to others. Examples of these may include beliefs held on faith – an individual may hold them to be a true belief, but also be cognizant that the justification is so personal as to negate communication. In order to establish a belief as knowledge, there must be some manner by which another individual can accept this belief as justified and true – i.e. the reliability of justification addressed by the Gettier conditions.

In moving to an expression of “(+)”, it is appropriate to note that the ultimate goal incorporates a process perspective – that of building knowledge – and must therefore address both process (building) and substantive (knowledge) perspectives. In the most general sense, the “(+)” must capture these two perspectives. The process component of reliable justification may be designated as a method – “a special form of procedure or characteristic set of procedures employed (more or less systematically) in an intellectual discipline or field of study as a mode of investigation and inquiry” [1]. Likewise, the substantive component of reliable justification may be designated as the context - the parts that surround the justification and give it meaning.

However, Kirkham [14] explicitly states that justification “cannot be improved by insisting that ... premises must be arrived at by a reliable method.” Given a variety of methods, one must determine a method that is reliable – an additional criteria that invites infinite regress. The use of “reliable method” here must be associated with “reliable context” – there must be some reason to presume the method is reliable, though that presumption may engender associated issues.

One impact of this definition is that it takes more than one person to build knowledge. This may be resolved in the sense of the lexicon presented above – but this does little to prevent misinterpretations in broader use. An individual may hold that they have knowledge in the JTB(+) sense – a knowledge claim - but if another individual rejects the justification, method or context then the knowledge claim does not rigorously meet JTB(+) criteria. In this sense, a justified true belief implies that an individual asserts meeting the JTB(+) criteria independent of the judgment of another individual, and knowledge to be that which fully meets the JTB(+) criteria. In either case, research canons must acknowledge this aspect of the JTB(+) definition in generating formalized representation of the criteria to build knowledge between individuals. To summarize the lexicon:

- Idea: A mental image, conception, notion [1].
- Belief: An idea held to be true.

- True Belief: A belief held to be reflective of reality.
- JTB: The assertion that an individual’s true belief can be communicated (externally justified).
- Knowledge Claim: The assertion of a JTB(+).
- Knowledge: The acceptance of a JTB(+).

Finally, this definition presumes an ontological foundation (the existence of someone who knows and someone to whom that knowledge is justified) and an epistemological foundation (that there is “knowing”). Further, there is an implication that there is variation across individuals; otherwise such justification would not be necessary.

#### 4. Generalized Research Canons for JTB(+)

Accepting the JTB(+) definition of knowledge, and that research canons seek to build knowledge, then these canons should be directly traceable to the definition of knowledge asserted. By way of comparison to Figure 1, Figure 2 presents the objective condition: the derivation of generalized canons from a definition of knowledge such that there is some basis for reconciling knowledge claims across disparate philosophical foundations.

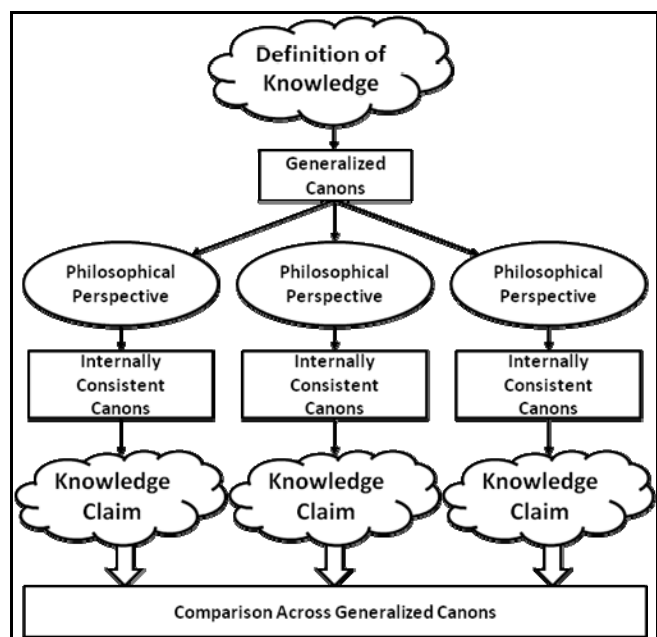


Figure 2. Application of Generalized Research Canons

Following the lexicon presented earlier, this discussion begins with what would ultimately become knowledge: a belief. The first canon is therefore the assertion of the truth of the belief; i.e. that it is reflective of reality. Truth is used in the sense of “consistent with fact; agreeing with the reality; representing the thing as it is [1].” This is not inconsistent with a representation of the unreal, as the representation itself is real; but it does speak to the notion of a representation as reflective of reality. The assertion of truth begins with an

idea as a construct within the individual; one that an individual would hold either as reflection of reality in terms of direct correspondence with reality or a true reflection of reality in terms of coherence with a set of propositions related to reality. In a general sense, the former can be held to be a subset of the latter – that is, correspondence with reality is coherence with a set of propositions held to be directly reflective of reality. Therefore, the challenge to establish truth is to generate that set of propositions, and demonstrate that the idea is coherent with that set of propositions.

Given a true belief, the next step in the maturation towards knowledge is second generalized canon of justification, earlier presented as the assertion that an individual's true belief can be communicated to others. The phrase "justification" is used in the sense of JTB(+); e.g. it must assert (for a knowledge claim) or accept (for knowledge) truth external to the individual - hence knowledge is not established absent the presence of JTB(+) across individuals. This introduces two other ontological considerations, as both communication and another individual are postulated, but does so without conditions – the ways and means of communications, the form of the other individual will be subject to the particular philosophical foundation for a specific set of canons.

Where truth speaks to the assertion of an individual's belief as reflective of reality and justification to the assertion of the ability to establish that truth external to the individual; a reliable method speaks to the ways of justification and a reliable context to the means of justification. Here, means are all of the resources (data sources, environment, etc.) that are used in the ways of justification. This places the method of justification in a venue (a scene or setting) which must be contained within a shared domain of ways and means between individuals for reliability to be established (via concurrence across individuals).

As discussed earlier, inconsistencies with philosophical foundations can introduce error into the justification, method or context. Internal consistency of a knowledge claim with its own philosophical foundations is therefore a prerequisite to establishing knowledge. This may be treated as a generalized canon in and of itself, or may be treated as a condition for the application of other generalized canons.

From the above discussion, the set of generalized research canons for JTB(+) knowledge is defined as:

- Truth: the research must establish that an individual's belief is reflective of reality (whether through correspondence or coherence);
- Justification: the research must provide for establishing truth external to the individual;

- Method: the research must establish reliable ways of justification; e.g. addressing the process or temporal validity; and
- Context: the research must establish the bounds in which knowledge is claimed, e.g. addressing the resources used in the ways of justification.

Table 3 provides a direct comparison of the generalized canons from Bozkurt [7] and generalized JTB(+) canons. Arriving at a compatible destination from two different starting points is simply the absence of negation and does not validate the approach *per se*; but does provide a measure of inductive support. The axiological principle of internal consistency mentioned earlier is implicit, and must be incorporated in any asserted philosophical foundation.

Bozkurt [7] Generalized Canons		Generalized JTB(+) Canons	Criteria
Internal Validity	Credibility	Truth	Establish an individual's belief as reflective of reality
Generalizability	Transferability	Justification	Establish truth external to the individual
Reliability	Dependability	Method	Establish shared ways of justification
Objectivity	Confirmability	Context	Establish shared means of justification

Table 3. Comparison of Generalized Canons from Bozkurt [7] and Generalized JTB(+)

## 5. Generalized Research Canons for Illustrative Philosophies

### Rationalism and Empiricism

Examination of perspectives in opposition provides insights on the underlying philosophical foundations; in this instance, the perspectives of rationalism and empiricism will be used as illustrative examples to frame the respective roles of knowledge and reality. Though similar discussions are allowable under different philosophical bases, these philosophies will be used to extract a point of diametric opposition that is problematic for complex situations (here, diametric opposition is used to indicate a point of disagreement between two philosophical foundations and does not obviate the potential for duality within a philosophical foundation). This permits subsequent comparison with a different philosophical foundation as a means to reconcile diametrically opposed positions.

Markie [15] provides a definition of rationalism as the adoption of at least one of three claims:

- The Intuition/Deduction Thesis: Some propositions in a particular subject area, S, are knowable by us by

intuition alone; still others are knowable by being deduced from intuited propositions.

- The Innate Knowledge Thesis: We have knowledge of some truths in a particular subject area, S, as part of our rational nature.
- The Innate Concept Thesis: We have some of the concepts we employ in a particular subject area, S, as part of our rational nature.

An alternate perspective is that of empiricism, which can be briefly stated via the “The Empiricism Thesis: We have no source of knowledge in S or for the concepts we use in S other than sense experience” [15]. In the simplest perspective, the opposition of rationalism to empiricism is in the source of knowledge: it is either derived from reason or from experience – and in the extreme sense, it is derived solely from one source or the other. These positions are echoed in the philosophical perspectives of positivism which in the purest sense holds all knowledge to be gained through experiential means, and constructivism which in the purest sense holds all knowledge to be constructed within the intellect.

This debate of the rational vs. the experiential is traceable to positions set forth by Plato and Aristotle. Plato [10] held that ideas (*eidōs*, or Forms) are real and universal and matter is a specific instantiation of a form. Therefore “treeness” is real and the “tree” is an instance of “treeness” - agreeing that a thing is a tree constitutes implicitly agreement on the treeness of the thing. This hints at an underlying assumption of the duality of the material and immaterial – or body and soul – within Platonic philosophy; the mind is seen as distinct from reality and therefore perceptions within the mind have a fundamental reality. In a sense, “knowing” is unique and real, and the known is an instantiation of knowing – and therein lies the root of rationalism and constructivism. Concisely phrased, reality is a subset of knowledge. In this perspective, the presence of the duality is central to the construct. Conversely, Aristotle [16] submits that a particular substance is a combination of both matter and form; in this view, universals exist only as they are instantiated. Therefore, the “tree” is real, and “treeness” is a quality of the tree. The essence of the argument is the existence of a unitary objective reality; something that “knows” is part of this reality, hence “knowing” is subsumed by reality. In concise phrasing, knowledge is a subset of reality.

The diametrically opposed conclusions of the two philosophical perspectives reflect back to the notion of internal consistency with philosophical foundations. A perspective that rests upon a duality (whether material/immaterial or mind/body) permits subsuming one to the other; a perspective that rests on a unity necessarily subsumes all to that unity. Of principle interest in the matter of knowledge claims is the consistency of the claims with the foundational philosophy – a rationally asserted knowledge

claim must be consistent with the duality, and an empirically asserted knowledge claim must be consistent with the unity.

For more extreme interpretations of rationalism, the applicability of generalized JTB(+) canons ends with truth and justification – what is innate is known and true; and what is derived from that in a consistent fashion is likewise known and true. The reliability of method is the reliability of the justification and the reliability of context is the reliability of the innate; a justified true belief is knowledge and requires no additional conditions. As earlier stated, the notions of communication and the individual communicated to are governed by the foundational philosophy. Hence, the context for justification is the existence of innate knowledge and the method for justification is the internal consistency of reality (universals).

For empiricism, the earlier canons presented in Bozkurt [7] are directly applicable. Truth is established from sense data which must be acquired in a credible manner. Justification must establish that this true belief can be communicated to another individual, either by generalizing a specific case or by transferring to commensurate cases. Since sense data is the singular source for reality, the method for justification must be reliable (or dependable) so as not to introduce extraneous error. Finally, the context must be objective or confirmable so as to be accepted by both individuals. The notions of communications and individuals communicated to are commensurate with the primacy of sense data.

## 6. Areas for Further Research

Several areas merit additional research, beginning with the specific definition of JTB(+). Further, the establishment of generalized research canons for one definition of knowledge invites the development for other definitions of knowledge – which would provide an additional basis for comparing the definitions for knowledge itself; i.e. going beyond what it is to how it is applied. The particular lexicon for canons, though developed to aid in the derivation, also assists in clarifying the discussion – for different philosophical foundations, canons can have different interpretations that are illustrated through the lexicon. When asserting research canons for a philosophical foundation that departs from traditional discourse, such a lexicon may carry with it unnecessary or undesired connotations. Using the JTB(+) definition for knowledge in conjunction with a defined philosophical foundation permits derivation of generalized research canons, and provides for an open discussion on the appropriate definitions and characterizations of them for internal consistency.

The application of generalized research canons for specific philosophies invites investigation of other philosophies – the illustration for empiricism and rationalism provided here enables a dialog on research and research methods across

such situations. Leveraging methods founded on different philosophical foundations – as is likely in multidisciplinary research - will constrain and potentially inhibit building knowledge in the absence of some means to reconcile knowledge claims across research with disparate philosophical foundations and/or canons.

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## About the Authors

**Andres Sousa-Poza** is an Associate Professor of Engineering Management & Systems Engineering at Old Dominion University. He has a B.Sc. in Mechanical Engineering from the University of Cape Town and both an M.S. and Ph.D. in Engineering Management from the University of Missouri-Rolla.

**Van Brewer** is a Senior Operational Manager for Computer Sciences Corporation. In addition, he is currently pursuing his Ph.D. in Engineering Management and Systems Engineering at Old Dominion University.