

**Dialogue Across Cultures:
Extending Mathematical, Scientific and Aesthetic Inquiry into Religion and Morality**

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1. Introduction¹

1.1. Two related problems

There are two related problems that I would like to address in this presentation, one epistemic (i.e., related to our beliefs) and the other pragmatic. The epistemic problem is a *failure of consilience* in academia, arising from conflicts in the norms (and practices) of admissible assumptions, admissible grounds, admissible reasoning, and appropriate criteria of evaluation. These conflicts often impede the integration of knowledge and informed opinions from the natural sciences, the social sciences and the humanities. But these conflicts also occur a between factions internal to an area of inquiry, such as physical vs. human geography, physical vs. cultural anthropology, positivistic vs. interpretive sociology and political science, generative linguistics vs. sociolinguistics, mainstream vs. constructivist mathematics, and mainstream and alternative medicine.

The pragmatic problem is that of the *socio-religious conflicts* between human groups, arising at least partly from conflicts of values, as well as from either religious or secular faith, or ideological commitments. Such conflicts are particularly acute when multiple socio-religious groups compete for limited resources, or there are sudden changes in their socio-economic status. And when faith carries an assumption of the superiority of one's own group, the results can be devastating. Problems of rising fundamentalism in India, and in the United States, among other parts of the world, would be telling examples.

1.2. Two related solutions

In search for solutions to these problems, I have been pursuing a research program and an educational project. The research program seeks to develop an epistemological infrastructure for academic inquiry, as part of the pursuit of consilience. Its goal is to provide an integrated understanding of the grounds, assumptions, reasoning, and criteria of evaluation across varied academic terrains. It should address, for instance, the unity and the diversity in the concepts of proof in mathematics, law, and in experimental research. It would also investigate how these notions of proof connect to the broader concept of justification in other areas such as ethics and aesthetics.

Based on the results of the research program, the educational project seeks to

- develop a curriculum and learning resources to help students develop the capacity to engage in inquiry and critical thinking in the mathematical, scientific, and aesthetic domains, and
- extend these modes of intellectual functioning to the moral and religious domains.

¹ I would like to thank the organizers of this conference for inviting me to present some of my ideas at this round table. It is an immense honour and privilege to be in the company of such eminent scholars.

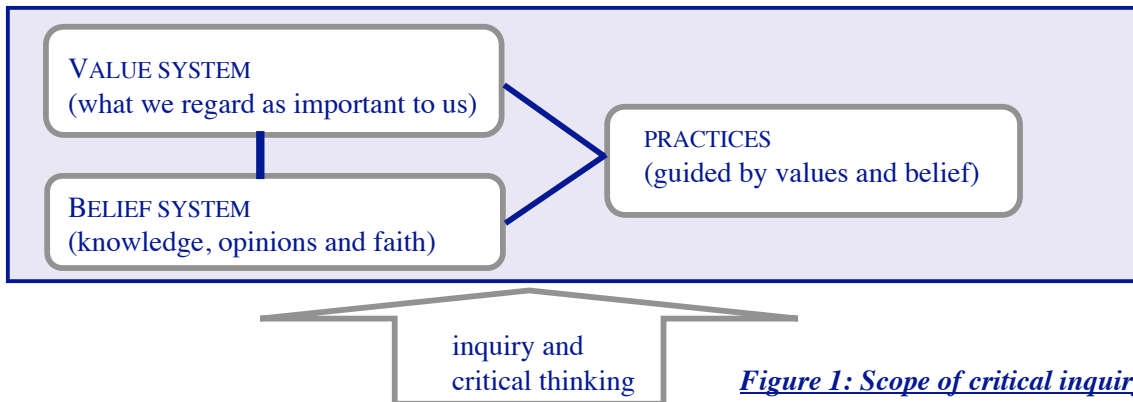
2. Building a trans-disciplinary infrastructure across terrains of academic inquiry

The domains of inquiry that I am concerned with are those of *beliefs*, *values* and *practices*. Beliefs include such things as knowledge, opinions, rational faith, blind faith, superstition, mythology, and dogma. Of these, only knowledge, opinions, and rational faith would come within the terrain of academia, and hence be within the scope of a theory of academic inquiry.

A note about the terminology:

- By *knowledge*, I mean a body of conclusions that we judge to be true beyond reasonable doubt.
- *Opinions* lack the degree of certainty that knowledge has. Furthermore, unlike in the case of knowledge, two contradictory opinions can both be judged as rationally justified.
- By *faith* I mean religious or secular beliefs that are foundational and axiomatic. We appeal to them for the justification of non-foundational positions, but they cannot themselves be justified or refuted. Under this definition, ideology would be a system of faith that has an impact on relations of power or self-interest.

The domain of academic inquiry as beliefs, values, and practice is given in Figure 1 below:



Let me give a brief illustration of the interaction between beliefs, values and practices. For moral reasons, I generally do not eat eggs laid by factory-grown hens. The decision on this comes from (a) the knowledge that industrialized farming of chicken involves extreme suffering to those creatures, and (b) a value system that assigns high priority to not contributing to the suffering of human as well as non-human organisms. In contrast, I do drink milk from factory-farmed cows. This looks like a contradiction. But the contrast can be explained by the pragmatic value that I assign to my physical well-being which overrides the moral value of not contributing to the suffering of non-human organisms: self-interest wins over moral considerations.

To return to the research program and the concomitant educational enterprise, both are based on two relatively uncontroversial canons of rational inquiry:

- (1) Our practices, our knowledge, and our opinions must be supported by *sound justification*.
- (2) The totality of our values, practices, and beliefs (including knowledge, opinions and faith) must be *maximally coherent* (= consilient), each one internally as well as with one another. The prohibition of inconsistency (or logical contradictions) is one of the components of coherence.

Though uncontroversial, the serious pursuit of these conditions has radical consequences. Examples that illustrate the application of these principles are given in (3a-c):

(3) Examples of (1) and (2)

- a. The belief that the earth revolves around the sun and rotates on a tilted axis. As an undergraduate student, the only basis for this belief was that my teachers and textbooks told me that the heliocentric model was the correct one. Without justification for this belief, condition (1) should have disallowed my regarding it as part of my knowledge. My belief was at best a doctrine or dogma. Subsequent to my PhD in linguistics, I learnt about the relevant evidence, such as the ‘retrograde motion of planets’ and Foucault’s pendulum experiment. This led to my evaluating the relevant evidence, and deciding for myself (rather than trusting authority) that the heliocentric model was superior to the geocentric model. Now that my belief is accompanied by adequate justification, condition (1) allows me to regard it as knowledge.
- b. The beliefs that (i) there is an external world outside my consciousness, (ii) this world is governed by simple principles of organization, and (iii) these organizational principles are not logically contradictory. These beliefs are not justifiable on independent grounds. This means I cannot treat them as part of my knowledge. Yet, I need them as foundational beliefs for me to live a meaningful life and to engage in teaching and research. Since there are no reasons to reject these beliefs, and they are not inconsistent with the totality of my beliefs, values, and practices, condition (2) allows me to view these beliefs as part of my rational secular faith.
- c. The proposition that ghosts exist. Given that there is no rational justification to support this belief, the conclusion recommended by rational inquiry is the null hypothesis, that ghosts do not exist. Condition (1) disallows the belief in ghosts as knowledge or opinion, and condition (2) disallows it as faith, given that there is a rational conclusion to the opposite. Given the banishment from the category of academic beliefs, this proposition could be categorized as blind faith, mythology, or superstition.

Principle (1) needs to be understood in terms of the structure of justification in figure 2:

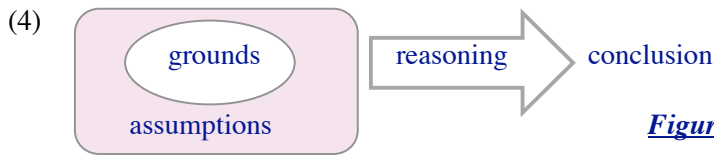


Figure 2: Structure of Justification

The response to the next question, namely, “What is sound justification?” is attempted in the functional definition in (5) that adapts and generalizes Keith Devlin’s “left wing” idea that a mathematical proof “...is an argument that convinces a typical mathematician of the truth of a given statement.”²

- (5) A justification is SOUND for a jury of inquirers if it *rationally* convinces the jury that its conclusion is correct.

What are the requirements that must be met for the jury of inquirers to be convinced? The following answer seems applicable to any domain of academic inquiry:

² Devlin, Keith (2003) “When is a proof?” in MAA online: The Mathematical Association of America (http://www.maa.org/devlin/devlin_06_03.html)

- (6) A justification rationally convinces a jury of inquirers if they judge that
- a. the *grounds* in the justification are *trustworthy* (= reliable/ accurate/ credible/ true)
 - b. its *assumptions* are *legitimate/acceptable*
 - c. its *reasoning* is *valid*, that is, the conclusion follows from the grounds. This means that
 - i. the *grounds* are *appropriate* for the conclusion, and
 - ii. the *steps of reasoning* from the grounds to the conclusion are *correct*.
 - d. its *conclusion* is *not threatened* by
 - i. *counterexamples/counter-evidence* or
 - ii. *alternative conclusions*, and
 - e. its *conclusion* is *consistent* with other, more firmly established beliefs and positions.

The canons of rationality in (1) and (2), and the notion of sound justification in (6), work for both mathematics and the natural sciences. The difference between the two domains lies in the specifics of the kinds of justification used. The grounds for justification in mathematics are axioms and definitions, or already existing knowledge (in turn derived ultimately from axioms and definitions). Its admissible mode of reasoning is that of classical deduction. The grounds for justification in the natural sciences, on the other hand, are sensory perceptions or their instrumental equivalents. The admissible modes of reasoning are sample-to-population induction for correlational claims. For interpretive and theoretical claims, the modes of reasoning are abduction and speculative-deduction, both of which are forms of defeasible reasoning that crucially calls for (6d).

The move from the natural sciences to the social sciences calls for the inclusion of verbal evidence in addition to sensory perceptions. And the move from scientific inquiry to aesthetic inquiry calls for culture-specific semi-subjective grounds such as aesthetic judgments and trained perception often accessible only to those steeped in the tradition of art in the relevant culture. Whether or not a piece of paper that we are looking at is turning blue can be observed by any member of the human species, and corroborated by independent observers regardless of their socio-cultural upbringing. But whether or not a pitch movement violates the pattern of a particular *raaga* in Indian classical music can be discerned only by those who have been exposed to the tradition and have internalised its culture-dependent grids.

3. Extending the infrastructure to religious and moral inquiry

Is it feasible and desirable to extend the academic canons of inquiry and justification to the domains of morality and religion? Is it feasible and desirable for institutions of secondary and tertiary education to include in their curriculum, moral inquiry and religious inquiry as forms of academic inquiry? My answer to both questions is 'yes'.

Such an extension can take two forms. One of them is hermeneutic inquiry. It involves helping an individual inquirer or a group of inquirers with the same socio-cultural and religious background, to engage in academic inquiry in terms of the grounds that are acceptable to that individual or group. Given below is an example. (Additional examples are given in the appendices.)

- (7) Suppose an inquirer's grounds include the beliefs that:
- a. God exists;
 - b. God is omnipotent, omniscient, and omnipresent, and is the embodiment of love, compassion, mercy, and justice;
 - c. God sends to Hell the souls of those who doubt His existence or subscribe to some other God; and
 - d. the Old Testament is the word of God.

These statements taken together involve the classic cases of logical contradictions discussed in the philosophy of religion. Someone who does not subscribe to any of these positions can still enter the believer's circle of commitments, and together they can engage in the activity of checking for logical consistency between the positions on God. For instance, if God is the embodiment of justice, mercy and compassion, how can He also send to hell (to suffer eternal torture) those who happen to have been born into a different religious community?

The other strategy would be to engage in religious inquiry in a multicultural and multi-religious community of inquirers – say, in a classroom with believers from different religions – to pursue collective critical inquiry into their value systems and faith.

I must add that it is important to distinguish what I have called religious inquiry from theological inquiry, along the lines indicated in (8).

- (8) Theological inquiry is parochial: its grounds are the scriptures and non-negotiable doctrines of a particular religious community. Inquiry within Christian theology, for instance, takes the divine origins of *The Bible* for granted, denying the divine origins of the *The Gita* that Hindu theology takes for granted. That Jesus was the Son of God is a non-negotiable foundational doctrine in Christian theology, a position that is explicitly denied in *The Koran*, a text that is taken to be of divine origin in Islamic theology. Such parochialism has no place in religious inquiry if it is to exist as a form of academic inquiry.

If we take the scriptures of any one religion as admissible grounds, the community of inquirers in a multi-religious community must accept the scriptures of all religions as admissible grounds. The canons of rational inquiry also demand that we subject the verbal evidence of the scriptural texts to critical examination, with an awareness that what is reported in the texts as an instance of divine revelation, for instance, could easily be an instance of hallucinations of the kind associated with the left temporal lobe epilepsy.

This means that, unlike theological inquiry, academic religious inquiry seeks to investigate the question in (9), and has the set of commitments spelt out in (10), shared across different domains of academic inquiry.

- (9) What is the nature of the timeless spaceless reality variously conceptualized as 'God', 'Divine', 'Sacred', 'Brahman', and 'Emptiness'? The answer to this question is an academic theory of the Ultimate Reality. One of the candidates for such a theory is the Big Bang theory, which takes the monistic position that the universe we live in has emerged from that reality.
- (10) a. Inquiry and critical thinking would be collaboratively pursued in a community of inquirers with diverse religious persuasions, including atheism.
- b. Only those grounds that are acceptable to the community of inquirers as a whole, regardless of their religious affiliations, can be offered in support of the claims we are debating on and those we wish to defend.
- c. Our conclusions must be free of logical contradictions and maximally consistent with more firmly established bodies of knowledge from independent sources.³

We cannot expect that such forms of religious and moral inquiry would lead to a universal consensus, any more than it does in aesthetic inquiry. Nor can we expect that it would invariably translate into beneficial

³ If we make this move, religion and science do not need to belong to non-overlapping magisteriums of the kind that Stephen Jay Gould proposes. (Gould, Stephen Jay (1997), "Nonoverlapping Magisteria," *Natural History* 106) Rather, mathematical, scientific, aesthetic, moral, and religious inquiries belong to the same magisterium of rational inquiry, though with slightly differing norms of grounds, reasoning, and criteria of evaluation.

action any more than we expect the discourse of human rights to transform the practice of those who wield political power. Nor can we expect that it would invariably translate into beneficial action. What it can do is extend the mindset and habits of mind that are prototypical of scientific inquiry to domains that have so far been insulated from academic interrogation. These include skepticism, willingness to challenge “authority”, open-mindedness, an awareness of the fallibility and uncertainty of human beliefs, the willingness to look for evidence, and the readiness to correct oneself if evidence demands it. If education helps the young develop these attitudes and habits of mind, they have a better protection against fundamentalist indoctrination of various sorts.

I have engaged in this activity of dialogue and debate with students ranging in age from fifteen to thirty, as well as with people above thirty, some of them my colleagues at the university. My personal experience has been that the prisons of irrationality that religious and moral indoctrination erects in the human mind become difficult to break out of as one grows older, but still feasible when young. This experience is consistent with what we know about the human mind, and is likely to be corroborated by scientific evidence.

To dissipate the effects of violence stemming from parochial indoctrinations of culture and religion, it is not sufficient to engage in dialogues – across cultures or civilizations – among those entrenched in the positions they have been indoctrinated with, and those wielding socio-political power. It is of utmost urgency to engage those who are going through their secondary and tertiary education, and to provide them the experience of rigorous moral and religious inquiry, so that they have a chance to inoculate themselves against indoctrination.

Some of today’s young will in the future wield power, others will act on their call, and yet others will become citizens who can exercise some degree of control on the first two groups. If we can help them acquire the mindset and habits of mind of scientific inquiry, and protect them from indoctrination, humanity stands a slightly better chance of escaping from the misery we inflict on one another..

Extending the spirit of scientific inquiry – as opposed to the mere content knowledge of science that results from that inquiry – to domains outside of the subject matter of science can act as a protection not only against religious and moral indoctrination, but also against the indoctrination and propaganda of governments, corporations and even the academics. The last category is particularly important: if I want my students to learn what I value in human beings, it is important that they begin by challenging my beliefs, practices and values, including the very values on which my teaching is embedded in.

Whether or not we can win the political battle to incorporate these forms of rational inquiry into educational institutions is a more difficult question that I have no answer to. Given that what I am proposing involves helping the young to challenge all those who exercise power over them, chances are that those who wield the power would be uncomfortable with that enterprise. Perhaps a solution would be for the World Knowledge Dialogue to initiate a wing of education through the World Wide Web.

The initial results of my educational project that applies the results of the research program can be found in the units on academic inquiry in the web course on Academic Culture at <http://wiki.nus.edu.sg/display/aki/Home> and the course on Academic Knowledge and Inquiry at <http://emodule.nus.edu.sg/ac/> at the National University of Singapore. For an initial attempt at web-based religious inquiry, see <http://emodule.nus.edu.sg/aki/v1/dev/religious/>

APPENDICES

I have used the following sets of proofs as examples of the extension of mathematical inquiry into the domain of faith.

A. PROOFS OF THE EXISTENCE AND NON-EXISTENCE OF GOD

A 'proof' of the existence of God:

Definition: God is that reality which is spaceless and timeless.

The Big Bang theory of cosmology tells us of a spaceless and timeless reality. [Shared knowledge.]

By our definition, this reality is God.

Therefore God exists.

A 'proof' of the non-existence of God:

Definition: God is that reality which is spaceless and timeless.

Axiom 1: God is *omnipotent*: There is nothing that God cannot do except be logically inconsistent.

Axiom 2: God is *omniscient*: God knows everything, including the past, present, and future.

Axiom 3: God is *perfectly moral*.

We know that suffering exists. God is aware of human suffering. [Shared knowledge + Axiom 2]

If an action can save life or reduce suffering, not acting is immoral. [Shared moral principle]

God has the capacity to remove human suffering. [Axiom 1]

But since suffering exists, God has chosen not to remove suffering. Hence God is immoral.

But God is also perfectly moral. [Axiom 3]

This is a logical contradiction, and hence God cannot exist.

Your own definition of 'God' probably deviates from both of the above. What *is* your definition?

Without making it absolutely clear what you mean by the word 'God' (which would amount to constructing a theory of God), we cannot answer the question, "Does God exist?"

B: PROOFS OF THE EXISTENCE AND NON-EXISTENCE OF HELL

Use the configurations of axioms and definitions below to prove that Hell (a) exists, and (b) doesn't exist.

Configuration I

Axiom 1: God exists.

Definition: Hell is a state of mind in this life (before death) of not experiencing the bliss of being in contact with God, as a result of sinful/evil actions and/or absence of faith/belief in God.

Configuration II

Axiom 1: God exists.

Axiom 2: God has *pre-ordained* everything in our universe, i.e., everything in our universe including which sentence I am going to type next happens because God has decided so.

Axiom 3: God is *omnipotent*: There is nothing that God cannot do other than be logically inconsistent.

Axiom 4: God is *omniscient*, i.e., God knows everything, including the past, present, and future.

Axiom 5: God is *perfectly moral*.

Axiom 6: God is the epitome of *compassion* and *forgiveness*.

Definition: Hell is a place where human souls after death suffer unbearable, everlasting physical pain as God's punishment for (i) their sinful/evil actions, and/or (ii) absence of faith/belief in God.

What would happen if we removed axiom 2 from configuration II? Is it possible to arrive at the same conclusion by appealing to axiom 5 or axiom 6?

What is the effect of part (ii) in the definition of Hell?