laetus in praesens

Alternative view of segmented documents via Kairos

1 September 2024 | Draft

Comprehensible Mapping of the Variety of Fundamental Governance Functions

AI-assisted clarification of cognitive challenge of organization of disparate memes

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Introduction

Thiere is no lack of recognition of the dangerously fragile condition of global civilization, epitomized by ever increasing threats of nuclear catastrophe. The period is witness to major ongoing conflicts, most obviously with respect to Israel-Palestine and Russia-Ukraine, but less obviously in other arenas. As is typical of such conflicts, each side and its supporters, frames its own cause as unquestionably righteous and that of the other as the epitome of wrong doing -- possibly meriting repressive legislative measures, and potentially to be qualified as "evil" (*Existence of evil as authoritatively claimed to be an overriding strategic concern*,

2016; *Framing by others of claimants of evil as evil*, 2016). There is no lack of authoritative references to the "Axis of Evil", with the implication that the recognition is necessarily made from the perspective of an "Axis of Good" (*Ensuring Dynamics of Sustainability by Appreciative Recognition of Evil*, 2022).

As previously noted, there is seemingly little academic or diplomatic capacity to address and transcend that polarization of perspective -- and seemingly little motivation to do so. The divisiveness now permeates the social fabric in many countries, rendering highly problematic any fruitful dialogue on such matters. The situation is framed in a curious way by the contrast between the inability to envisage any so-called "two-state" solution and the complex of issues regarding gender identity in the light of the LGBTQ+ controversies. This exploration follows from the earlier evocation of the possibilities and challenges (*Reframing "Two-state" Possibilities*, 2024; *Clarifying a Two-state Pattern Language of 64 Modalities*, 2024).

It has been assumed that the challenges of the times can be effectively addressed to an adequate degree by the UN's *Summit of the Future* (Jeffrey D. Sachs, *The Summit of the Future*, *Transcend Media Service*, 8 July 2024). It remains unclear whether the integrative objectives of such an event will benefit significantly from widespread preoccupation with the dangers of AI following the UN's earlier *AI for Good Global Summit* (2023) -- events in which it is does not appear that any significant use is made of AI.

Fear-mongering with regard to AI is now a prevailing pattern, variously anticipated (*Artificial Intelligence and International Affairs: disruption anticipated*, Chatham House, 2018; Anupama Vijayakumar, *Potential impact of artificial intelligence on the emerging world order*, *F1000Research*, 11, 2022, 1186). By contrast the potential value of AI to such dialogue has been explored separately (*Envisaging the AI-enhanced Future of the Conferencing Process*, 2020; *Use of ChatGPT to Clarify Possibility of Dialogue of Higher Quality,* 2023).

Understanding of the issues is in process of reframing (Katharina E. Höne, *Mapping the challenges and opportunities of artificial intelligence for the conduct of diplomacy*, DiploFoundation, 2019; Zaman Majed Auda, et al, *Artificial Intelligence and Evolution of the Global System*, *Islamabad Policy Research Institute*, 22, 2022; Christina D. Meleouni and Iris-Panagiota Efthymiou, *Artificial Intelligence and its Impact on International Relations*, *Journal of Politics and Ethics in New Technologies and AI*, 2, 2023, 1; Fatima Kukeyeva, et al, *Theoretical and Methodological Approaches to Studying Artificial Intelligence in the Context of International Relations and International Law*, *Journal of Central Asian Studies*, 2024).

The focus in what follows is on the experimental use of AI -- in the form of ChatGPT 4 and Claude 3 -- to explore possibilities of comprehensible configuration of the complexity with which global governance processes are associated. It is a development of an earlier initaitive (*AI-enabled Mapping and Animation of Learning Pathways*, 2024). Given global tensions between "West" and "East", the approach considers both perspectives explicitly, as well as underlying cognitive implications (*Coherent Reconciliation of Eastern and Western Patterns of Logic*, 2023; *Perspectives of AI on Psychosocial Implications of Global Modelling*, 2024). In aspiring to save the planet, it is as yet unclear whether the *Summit for the Future* will seek to benefit from AI facilities -- despite its specific intention of ensuring restriction in its use (*Global Digital Compact*, 2024; Steve Lohr, *Will A.I. Ruin the Planet or Save the Planet? The New York Times*, 26 August 2024).

The specific focus here is on the use of an adequately complex polyhedra, the truncated tesseract, as a means of "holding" both those interrelated functions held to be objective, as well as the paradoxical insights with which their comprehension may be held to be associated. This is a further development of an AI-enabled methodology to reframe binary bias (*Clarifying a Two-state Pattern Language of 64 Modalities*, 2024). The 64 vertices of the three-dimensional projection of this 4D configuration offer a framing within which UN's 8-fold and 16-fold strategic articulations (as with the Millennium Development Goals and the Sustainable Development Goals) can be related to complementary patterns of insight.

The primary bias of this exploration is a preoccupation with rendering complexity comprehensible and coherent in a period in which the disciplines with greatest competence with respect to complexity are seemingly completely indifferent to whether their insights are comprehensible. Comprehension is typically

not a concept in disciplines requiring that of others. This is curiously matched by the indifference to complex insights on the part of those most preoccupied with the increasing challenges of governance -- despite occasional metaphorical references to "organizational geometry" and "variable integration geometry" (Dennis M. Crossen, *Organizational Change Model in a Geometric Framework*, *International Journal of Strategic Decision Sciences*, 5, 2014, 4). Given the potential of AI, it is appropriate to question the UN's capacity to engage with its possibities -- despite explicit calls for innovation (*UN deputy chief demands bold policies, innovative solutions for SDGs*, *UN News*, 8 July 2024). Fundamental to the challenge of comprehension of complexity is the cognitive load with which this may be associated in a period of widely acknowledged information overload.

As in the previous experiments, the responses of ChatGPT 4o are distinctively presented below in grayed areas, in parallel with those of Claude 3.5. **Given the length of the document to which the exchange gives rise, the form of presentation has itself been treated as an experiment** -- in anticipation of the future implication of AI into research documents. Web technology now enables the whole document to be held as a single "page" with only the "questions" to AI rendered immediately visible -- a facility developed in this case with the assistance of both ChatGPT and Claude 3 (but not operational in PDF variants of the page, in contrast with the original). Reservations and commentary on the process of interaction with AI to that end have been discussed separately (*Methodological comment on experimental use of AI*, 2024)

Show All AI Responses

Relevance of the truncated tesseract as a template for global comprehensible mapping

The question as to why a more complex geometrical configuration merits exploration as a means of rendering comprehensible global strategies has been variously addressed separately, notably in relation to the UN's 16+1 Sustainable Development Goals (*Comprehensible Configuration of 8-fold Psychosocial Patterns in 3D*, 2024; *Higher Dimensional Reframing of Unity and Memorable Identity*, 2024)

The question acquires new relevance now that the UN explicitly aspires to "turbocharge" achievement of the SDGs as a consequence of their acknowledged failure to date (*The Global Sustainable Development Report 2023*, 2024). Arguably a factor in such failure is their relative incomprehensibility as a set -- represented, as is typically the case, as a simple "to do" list (or in tabular form) with no memorable systemic implications fundamental to their coherence or credibility. Is global governance worthy of more than a "to do" laundry list at this time? The "turbocharge" metaphor is however especially misleading with its implication that the challenge to comprehension is simply that of using an "accelerator" pedal -- thereby avoiding issues relating to the requisite complexity of the engine. Given the current reframing of the SDG initiative, there is a degree of irony to technical preoccupations with variable-geometry turbochargers.

The potential value of the truncated tesseract is that its complexity merits appreciation in cybernetic terms, as required by the challenge implied by the SDGs. To the extent that systemic mapping exercises are undertaken of relevance to global governance, that 4D configuration might be considered "worthy" of the challenge to their comprehension -- being of a different order to that of the oversimplification associated with tabular configurations (*Comprehensible Organization of Strategic Complexity in 3D and 4D*, 2024). As a 4D configuration it is an extension of the conventional use of unusual polyhedra to encompass the challenges of the 16 logical connectives fundamental to computer operation -- on which AI is necessarily dependent.

There is extensive commentary on the truncated tesseract from a geometrical perspective, notably with respect to the challenge of how an inherently "incomprehensible" 4D configuration is to be rendered comprehensible through its projection into 3D (*4D Visualization: enhancing 4D projection images*, *qfbox.info*; *Two Views of the Truncated Tesseract*, 30 August 2015). Use is made of one such projection from 4D to 3D in the following exercise, as discussed previously (*Clarifying a Two-state Pattern Language of 64 Modalities*, 2024). To what extent does the challenge of comprehension of the set of SDGs merit recognition

in a 4D configuration?

To the extent that the SDGs are to be understood as a collective global cognitive engagement with the time dimension, that challenge to perception of 4D may well offer clues to that of their comprehension (*Ungovernability of Sustainable Global Democracy? Towards engaging appropriately with time*, 2011). Curiously it is however rare to find consideration of the psychosocial implications of the tesseract (Sendy Ardiansyah, *Breath the Tesseract: Unveiling the Mysteries of Higher Dimensions*, *Medium*, 5 August 2023). Provocatively it may be asked whether promotion of the UN's SDGs is trapped in 2D in a form of "Flat Earth mentality" -- ironically whilst evoking the need for "multidimensional" perspectives. Evocation of time however features increasingly in the focus on urgency and deadlines, which might otherwise imply the need for unconventional innovative responses (*Time for Provocative Mnemonic Aids to Systemic Connectivity?* 2018)

As previously illustrated, there is a case for using the 3D projection of the 4D truncated tesseract to map coherently the relatively complex patterns of potential significance to global governance, discourse polarization, and related frameworks. As with the truncated tesseract, this enables the configuration of 64 distinctive governance modalities by mapping them onto the vertices of that structure. Such spatial placement recalls the mnemonic value associated with the traditional method of loci, as highlighted by Frances Yates (*The Art of Memory*, 1966) -- a consideration of relevance in a period much challenged by the erosion of collective memory.

Potentially relevant as a source of clues to comprehension of the detailed articulation of a 64-fold pattern of distinctions is the set of *I Ching* hexagrams, especially given the significance traditionally attributed to them through metaphor in relation to governance. As noted previously, whilst use of the *I Ching* is conventionally deprecated as "divination" in contrast to the science of "modelling" (as providing primary guidance for governance), modelling is itself vulnerable to other biases, most notably its questionable assumptions, oversimplfication, and hidden agendas -- together with a lack of transparency and comprehensibility (*Misleading Modelling of Global Crises*, 2021; *Perspectives of AI on Psychosocial Implications of Global Modelling*, 2024).

It is especially striking, in contrast to the "modelling" potentially offered by the *I Ching*, that there is little trace of the use "global modelling" to explore the structural transformation variously sought by the UN and others -- whether with the assistance of AI or not. Curiously it could be argued -- with respect to recourse to either "divination" or "modelling" -- that widespread use of AI might be explored as a reframing of those functions, whether deprecated or not. However, whereas they may well enable the quest for certainty in troubled times, AI offers remarkable capacity to elicit and generate complex patterns and to engage with them -- including the 64-fold patterns of the *I Ching.* In evoing possibilities, AI could then be understood, like the *I Ching*, as an "uncertainty machine" (Will Buckingham, *The Uncertainty Machine: forget prophecy and wisdom*, *Aeon*, 11 October 2013).

With psychosocial implications yet to be explored, the truncated tesseract offers an intriguing bridge to 16-fold and 8-fold preoccupations -- a challenge to comprehension in their own right -- whilst recognizing the role of more complex articulations which typically only take intuited symbolic forms in popular culture alien to global policy-making. Especially intriguing is the recognized topological relation of the truncated tesseract to the so-called 16-cell. The truncated tesseract (or tat)**,** is a convex uniform polychoron that consists of 16 regular tetrahedra and 8 truncated cubes. In geometry, the 16-cell is the regular convex 4-polytope (four-dimensional analogue of a Platonic solid). The dual polytope of the 16-cell is the hypercube or tesseract (4-cube). Clearly there is a possibility worthy of exploration that the SDGs -- whether 16 or 17 -- have some form of fundamental collective cognitive correspondence to such patterns of knowledge organization (*Systemic Coherence of the UN's 17 SDGs as a Global Dream*, 2021).

Given the possibility of mapping 64-fold conceptal articulations onto the truncated tetrahedron of 64 vertices and 48 faces, there is a case for integrating into that mapping the 48 koans of the classical collection of the *Gateless Gate* (*Mumonkan*). These could be presented on the faces of that configuration as an indication of

the paradoxical cognitive challenges with which the 64 are potentially associated.

There is a further possibility of using the 112 edges of the configuration to enhance the coherence of the representation. One approach is to associate them with the transformations between the conditions denoted by the hexagrams positioned at the vertices. Another approach is to consider how they might be related to what may be associated with circlets of mala beads -- which traditionally may number 108, therefore posing the question of the unmapped 4 (*Designing Cultural Rosaries and Meaning Malas to Sustain Associations within the Pattern that Connects*, 2000). A further issue is the challenge of configuring the traditional sets of 100 koans, as distinct from the 48 -- potentially upheld as a more fundamental subset. One possibility is to map them separately onto the 100-vertex Leonardo dodecahedron, for example -- and then to consider the topological relationship to the truncated tesseract. These are explored in a subsequent study.

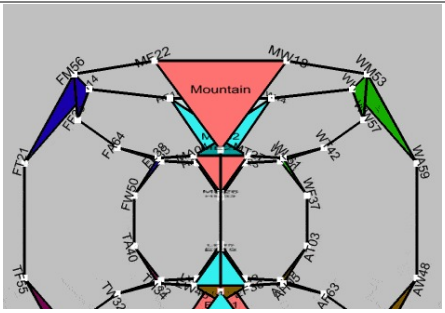
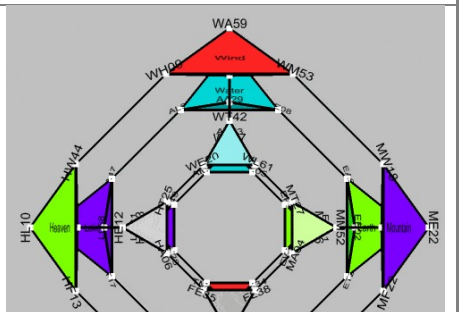
The concern with respect to these various sets is how they may distinguish and interweave fundamental insights -- potentially vital to sustainable governance. The truncated tesseract as a configuration offers the further possibility that its geometry may enable cycles and circuits to be memorably distinguished as vital feedback loops and learning pathways -- if only for mnemonic and discussion purposes (*AI-enabled Mapping and Animation of Learning Pathways*, 2024). The widespread criticism of AI skillfully avoids recognition of the advantages it now offers through its capacity for unprecedented forms of pattern recognition -- "re-search" of extant resources understood otherwise (*Coherence of Sustainable Development Goals through Artificial Intelligence*, 2023).

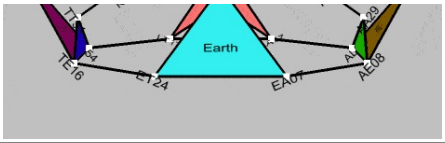
Whilst the steps in the following argument focused initially on the formal challenge of articulation and mapping, its development through interaction with AI was initially triggered by the challenges of configuring patterns of traditional insights of potential relevance to the cogitive paradoxes for governance, as potentially framed by the sets of *I Ching* hexagrams and koans, and the technicalities of representing Chinese symbols in conventional mappings. These are presented in concluding sections in which the possibility of associating innovative mappings with sound and colour for mnemonic purposes are indicated. There is a degree of irony to the fact that -- with the aid of AI -- those extensive articulations may offer valuable clues to patterns of coherence which conventional disciplines are challenged to provide and to which they are typically indifferent.

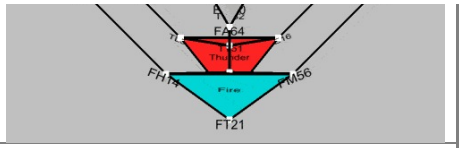
Beyond the list format conventioally favoured, it is approprite to note the proposal by Heiner Benking for a new world view, based on the Hyperlink Eco-Cube, for better understanding and communication about multi-disciplines like ecology (*Visual Access Strategies for Multi-Dimensional Objects and Issues*, 1993). An earlier approach of relevance is the matrix organization of the *Ekistics Grid Index* of Constantinos A. Doxiadis.

Mapping indications offered by traditional metaphors

The following animations are presented for convenience below in anticipation of the process by which they were elaborated -- as subsequently explained. In order to be able to use 2-letter codes for the vertices, that for "Water" was replaced by "A" (correspondinng to one of its alternative terms) in the following:. H="Heaven", E="Earth", L="Lake", M="Mountain". T="Thunder", F="Fire", W="Wind", A="Abyss/Water"

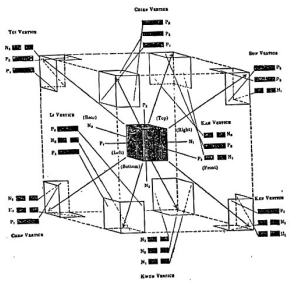
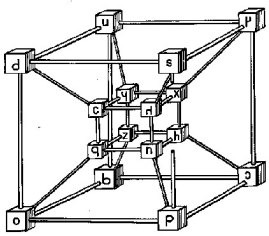
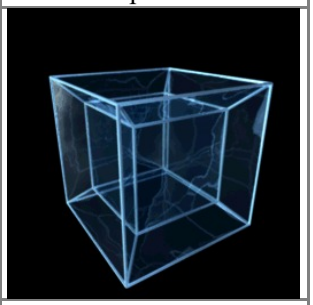
64-fold Articulated mapping of traditional metaphors onto 3D projection of truncated tesseract	
Rotation on one axis	Rotation on second axis
	





Animations made using *Stella 4D*

Ofsome relevance to the use of traditional metaphors for indicative labelling (as subsequently discussed) is the degree to which they bear a significant relationship to features of the global environment -- and their dynamics -- which are a preoccupation of ecosystem analysis and its comprehension in practice, as variously argued separately (*Weather Metaphors as Whether Metaphors*, 2015; *Enhancing Strategic Discourse Systematically using Climate Metaphors: widespread comprehension of system dynamics in weather patterns as a resource*, 2015; *Cognitive Embodiment of Nature "Re-cognized" Systemically*, 2018; *Existential Embodiment of Externalities*, 2009).

Indication of cubical correspondences of the tesseract		
Cubical representation of 8-fold *BaGua* pattern of *I Ching* by Z. D. Sung	**The Logic Alphabet Tesseract** - a four-dimensional cube (see coding). by Shea Zellweger	A 3D projection of a tesseract performing a simple rotation about a plane in 4-dimensional space.
		
Reproduced from Z. D. Sung, *The Symbols of Yi King or the Symbols of the Chinese Logic of Changes* (1934, p. 12)	Diagram by Warren Tschantz (reproduced from the Institute of Figuring) .	By Jason Hise; - Own work, Public Domain, Link

Question: One specific image above is the cubical representation of 8-fold BaGua pattern of I Ching by Z. D. Sung. The other is the The Logic Alphabet Tesseract - a four-dimensional cube by Shea Zellweger. With respect to the truncated tesseract (consistent with Zellweger's pattern), its 8 corners are indicative of positions of the 8 hexagram "houses". The corners are triangles of vertices with one inner vertex. That is linked to an inner "corner" of a triangle such that together these make up a pattern of 8 vertices with which hexagrams of a house could be associated. A design decision is required in positioning 4 of each house inside or outside in that configuration -- for each of the 8 corners -- or they could be understood as alternating. Does this make sense

 # Show/Hide AI response #

Question: Each trigram is traditionally associated with a label to be considered here only as a pointer avoiding misplaced concreteness and inappropriate definitional closure. The labels are Heaven, Earth, Lake, Mountain, Thunder Wind, Fire, Water. The question calls for the identification of metaphors derived from the subtle experiential relation to what is so labelled -- whether from the perspective of poets, deep ecologists, or the use of such metaphors to frame psychosocial contrasts, as with Gareth Morgan's 8 Images of Organization. In identifying one or more such metaphors for each trigram, one metaphor would relate to the trigram itself, three others would relate to the association with the proximate trigrams (eg for Wind: Wind/Water, Wind/Mountain, Wind/Heaven) and four to their opposites (eg for Wind: Wind/Thunder,

Wind/Lake, Wind/Fire, Wind/Earth). The latter set could be considered more implicit than the former. Is this a meaningful articulation of a project to list an 8x8 set of metaphors, each trigram then to be understood as contextually framed by a semantic field or memetic nexus

 # Show/Hide AI response #

Question: Given that shared understanding, are you able to identify a preliminary set of such metaphors for the 8x8 set (or some subset) thereof -- to the extent that this is not subject to your systemic constraints.

 # Show/Hide AI response #

Question: A concern with metaphors presented in that way, as with the traditional labels, is the ease with which they may be dismissed from the perspective of certain disciplines vulnerable to misplaced concreteness. Arguably there is a case for identifying systemic correspondences, as might be suggested by general systems theory. There is therefore a case for detecting the use of relevant metaphors as used by those disciplines but offering some correspondence with the set of 8. It is also the case, going to the other extreme, that more mystical reference to those conditions merit detection, typically in the allusions of poets -- potentially alienated by systemic language.

 # Show/Hide AI response #

Formal reframing of the mapping challenge?

The development of the following argument followed from an earlier exploration of the use of polyhedra in configuring memorable integrative frameworks (*AI-enabled Mapping and Animation of Learning Pathways*, 2024; *Challenge of memorable comprehension of 64-fold patterns as "cognitive fusion"*, 2024). As noted above, the following articulation was the surprising consequence of the interaction with AI in the earlier exercise which drew speculatively upon a traditional Chinese 8-fold articulation of modalities. The experimental elaboration of 64-fold articulation of relevance to governance was one outcome, as with their indicative mapping onto a truncated tesseract.

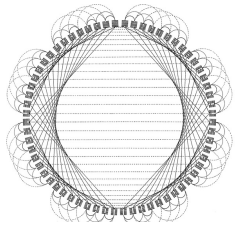
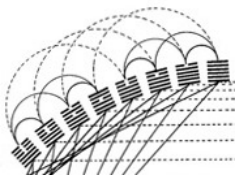
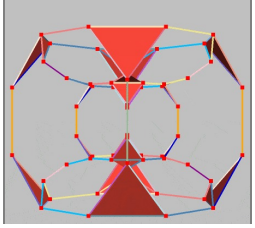
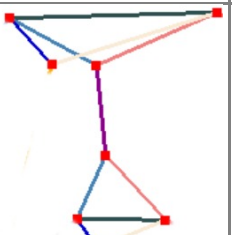
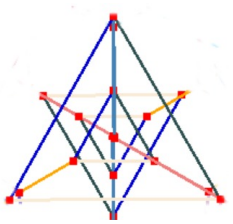
Question: With respect to the mapping of both the 64-fold and the 48-fold articulations, there is clearly a challenge in moving beyond arbitrary attribution. Further thought, and the aid of polyhedral combinatorics, might enable the elements to be significantly positioned in relation to great circles, axes of symmetry and the like -- suitably colour coded. Would you agree that it is too early to consider such systemic possibilities

 # Show/Hide AI response #

Question: The labels in the file provided were applied arbitrarily to the vertices of the animation. However they are clustered in terms of the hexagram houses. Each house has an 8-fold pattern of relevance to governance

 # Show/Hide AI response #

With respect to a mapping of 64 hexagrams onto a 3D projection of the truncated tesseract, an extensive exchange occurred with ChatGPT (and subsequently with Claude) with regard to the potential indications offered by the following images for mapping purposes

Shao Yung circle		3D projection of truncated tesseract		
Full circle	Detail of circle	Rotation	Detail of 8 corner nodes	Detail of corner
				

		Animation and images produced with the aid of Stella4D

Question: I do have access to the data on the link from one hexagram to another through any shift from yin to yang. It is possible that secondary (thinner) lines could be built into the X3D to render these transforms visible in order to rebalance the structure. Missing for me is how, as you have implied, the whole configuration presumably invites an elegant mathematical solution, yin-to-yang, rotation, etc

 # Show/Hide AI response #

Question: The definition of the problem and its visualization may be adequate as a means of attracting the requisite expertise. Of further interest i of course how the 48 koans might be associated with particular faces in any such configuration -- given the cognitive implications. Also of interest is the question raised with regard to the 112 edges in that configuration and how it might be understood as recalling the insights of a set of 108 mala beads, for example.

 # Show/Hide AI response #

Question: As a preliminary clarification for a subsequent question, is the following unambiguous. Each trigram is positioned at the corner of a cube, with the three defined by one line change at the three positions on proximate corners -- and with each matched by its opposite on opposite corners.

 # Show/Hide AI response #

The responses of ChatGPT were indeed reasonable and appropriate -- with a remarkable capacity to frame in detail what ought to be done -- but they implied a need to draw upon resources which were not readily available. This is a framing unfortunately typical of responses to many initiatives -- readily caricatured, as famously done in the phrase of Jack Nicholson: *"I'm drowning here, and you're describing the water!"* . It was therefore decided to explore the approach of Claude, as indicated by the following.

Question: With respect to a corner of a truncated tesseract, I am trying to work out how the linked tetrahedra might be used to map 8 hexagrams in that house. A useful pointer is the transformations of one to another within that array through the change of a single line between the trigrams which are not common to the house. A visual clue is provide by the shared image which shows the division into 8 houses, the hexagrams in each and the links between them. Can you help in splitting the trigrams of a single house into two tetrahedra linked at the top. Is that clearly explained.

 # Show/Hide AI response #

Question: You seem to have clarified most of it with a slight confusion. Expressed otherwise, if we label the tetrahedra A and B (accepting that one trigram is common to both), the changes of a single line in a trigram in A links only to another trigram in A. Those changes are mirrored by changes in B. One trigram only in A is linked to B. The challenge is to distinguish the two sets of trigrams, and the to linking trigrams

 # Show/Hide AI response #

That response resulted in an extensive exchange with Claude without which the attributions in the following images would not have been possible. Curiously that exchange made evident the difficulty of communicating a description of a 3D configuration to an AI which uses a quite distinctive "language" that did not facilitate its comprehension -- as in the old decription of describing a spiral staircase over the telephone to someone who has never seen one and has no concept of it. The attribution problem in 3D suggests an interesting test problem in the interaction of a user with an AI.

Even when agreement was reached, Claude continued to make mistakes -- which were readily acknowledged with apologies. It is appropriate to note that such facilities explicitly warn users to check for the possibility of errors.

The mapping was repeatedly tested for web presentation using the Stella4D application, X3D-Edit, and 3D viewers (H3DViewer, FreeWRL, Blender). That process highlighted technical constraints in enabling users to interact freely with the mapping in 3D via the web. These were further complicated by the possibility of representing hexagrams, with their traditional Chinese descriptors, as text labels (rather than images) using their unicode definitions. Use was finally made of the X3DOM protocol to enable such interactivity.

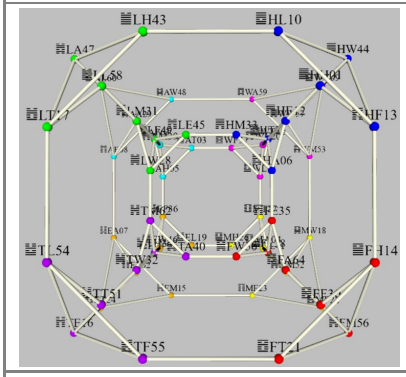
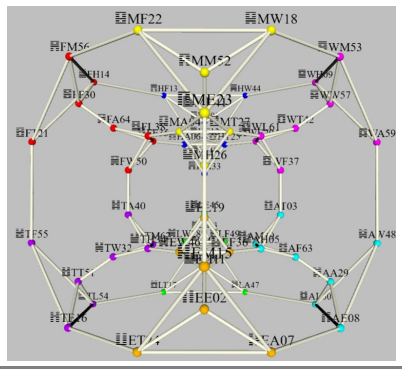
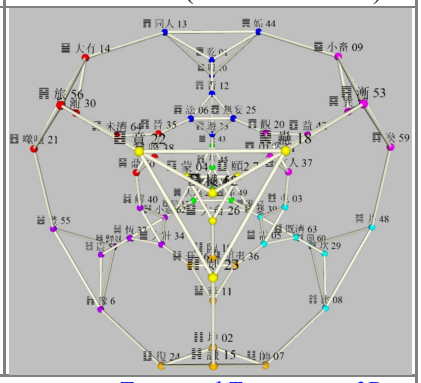
The static images below offer two perspectives on the mapping achieved -- with which readers can interact separately on most browsers (*Mapping 64 Policy-related Hexagrams onto Truncated Tesseract in 3D*, 2024).

The 64 nodes are presented in 8 clusters, distinctively coloured, at the corners of the truncated tesseract as a template. Following the hexagram, the first letter of the node label corresponds to the coloured corner -- and to the upper trigram. For outer corners, the second letter indicates one of three neighbouring corners. In the inner portions of the corner, the second letter is an inverted pointer to those corners which are not immediate neightbours. The number is that of the hexagram in the *I Ching*. Clicking on any node in the 3D presentation links to a page descriptive of that node from a policy perspective -- together with its relation to other nodes (*Transformation Metaphors*, 1997). That page also offers access to descriptions from the perspectives of sustainable dialogue, vision, conferencing, networking, community and lifestyle.

There are space constraints on the size and length of node labels as is evident from the images. Rather than increasing the size, readers can interact with alternative 3D presentations -- notably using either Chinese characters or explicit English metaphors -- which offer zooming facilities. The technical possibility of having the labels alternate between variants was provisionally set aside.

Indicative mapping of 64 hexagrams onto truncated tesseract

Nodes are labelled mnemonically in the 8-fold configuration. Letters correspond to traditional metaphorical labels (H, Heaven; E, Earth, L, Lake; T, Thunder; W, Wind; A, Abyss/Water; F, Fire; M, Mountain). Numbers correspond to those in the *I Ching*. Interactive variants: English, Chinese

Face view	Edge view	Corner view (Chinese version)
		

Interactive variants are presented separately (*Mapping 64 Policy-related Hexagrams onto Truncated Tesseract in 3D*, 2024).

16-fold pattern of logical connectives

The argument above focused on the extensively articulated (and much studied) 64-fold pattern of hexagrams of the *I Ching* and the possibility of its representation in 3D as an aid to comprehenson of the pattern as a whole. Ironically, as portrayed in a circle in 2D, the pattern was an inspiration to Gottfried Leibnitz in his consideration of the binary coding which became fundamental to the logical operation of computers. There is therefore a case for noting how that coding was developed in terms of the 16-fold pattern of logical connectives and their relation to consideration of the geometry of opposition, continuing the focus on the so-called square of opposition. (*Oppositional Logic as Comprehensible Key to Sustainable Democracy*, 2018; *Oppositional logic and its geometry -- 16 minus 2 connectives?* 2021; *Use of AI to enhance discourse analysis and mapping in the light of logical connectives*, 2023).

Despite the dramatic function of opposition in relation to the crises of global governance, it is rare to detect any recognition of the relevance of the logic and geometry of opposition in that regard (Fabien Schang, *A*

Formal Semantics of International Relations; *International Disagreements*, 2014; *A Formal Epistemology of International Relations*).

Of current relevance to this argument is the work of Lorenz Demey and Hans Smessaert (*Logical and Geometrical Distance in Polyhedral Aristotelian Diagrams in Knowledge Representation*, *Symmetry* 9, 2017, 10). The authors note: Aristotelian diagrams visualize the logical relations among a finite set of objects. These diagrams originated in philosophy, but recently, they have also been used extensively in artificial intelligence, in order to study (connections between) various knowledge representation formalisms. In this paper, we develop the idea that Aristotelian diagrams can be fruitfully studied as geometrical entities. In particular, we focus on four polyhedral Aristotelian diagrams for the Boolean algebra B4, viz. the rhombic dodecahedron, the tetrakis hexahedron, the tetraicosahedron and the nested tetrahedron.

It might then be asked whether and how a 16-fold articulation might be embedded in a 64-fold pattern -- notably considering how the 16-fold pattern is conventionally reduced to a 14-fold pattern for mapping purposes (*Oppositional logic and its geometry -- 16 minus 2 connectives?* 2021; *From 16 to 14 connectives -- precluding a logical meta-perspective?* 2021). For example, the template presented above isolates two nodes along each diagonal of 16 positions which could invite exclusion.

Question: The cube indeed offers an accessible degree of comprehensibility. It is therefore curious to note the complexification of the matter in the use of Aristotelian diagrams to visualize the logical relations among a finite set of "objects". Originally a preoccupation of philosophy alone, they have also been used extensively in artificial intelligence in order to study (connections between) various knowledge representation formalisms., most notably using variously "cuboid" polyhedra: the rhombic dodecahedron, the tetrakis hexahedron, the tetraicosahedron and the nested tetrahedron. As a means of articulating the geometry of opposition, they frame the question as to their relevance to engagement with requisite memetic variety

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Question: Given the discussion of the 16-fold formal articulation of logical connectives in this context, and the polyhedral mappings relating to the tesseract with which these are conventionally associated, it is appropriate to ask whether they could be meaningfully split two 8-fold complementary clusters. Could such clusters be usefully mapped onto two opposing corners of a truncated tesseract. As a "logical" set of 16, would this then evoke the question as to the cognitive significance of the 3 other 16-fold sets that could be associated with the remaining corners of that configuration -- potentially in the light of functions recognized as complementary to logic (sensation, intuition and feeling).

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Question: Each corner of the truncated tesseract offers an intriguing configuration of vertices, readily split into two linked clusters -- an "outer" and an "inner". Does this offer the possibility of splitting the 16 logical connectives into 4 clusters, if only for mnemonic purposes -- especially since many of the connectives are unfamiliar in popular discourse. What options are there for making such a split.

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16-fold emotional connectives, aesthetic connectives and multiple intelligences?

The ongoing controversial research into the emotional implication of AI has been reviewed separately with respect to "dumbing down" or eliciting a higher order of authenticity and subtlety in dialogue (*Artificial Emotional Intelligence and its Human Implications*, 2023). Its potential relevance is obvious in a period in which rational discourse is frequently reframed by emotional -- "irrational"--considerations. The possibility of "aesthetic connectives" follows from the importance associated with quality design in many domains -- and the possibity of correspondences between their polyhedral representation (*Comparable Modalities of Aesthetics, Logic and Dialogue*, 2021) .

Question: Given the extensive interest in the development of emotional AI applications, has there been any consideration of "emotional connectives" as analogues to the formal articulation of logical connectives.

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Question: With an increasing degree of credibility potentially accorded to "emotional connectives", notably in relation to AI, it is appropriate to explore what might be termed "aesthetic connectives" -- especially as these might relate to the intuitive cognitive functions of qualitative appreciation and creativity. Might these also be found to be analogous to logical connectives -- and complementary to them.

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Question: It is of course the case that logical connectives can be represented by binary codes, given their formal role in computer logic. It is also the case that such binary representation can take a form similar to the hexagrams which feature in this exchange -- although rather than being 6-line hexagrams they are 4-line tetragrams (as in the shared document). Could this suggest how such connectives -- whether logical, emotional or aesthetic -- might be arrayed in the truncated tesseract, given the mappings of hexagrams there (as discussed earlier).

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Separate consideration has been given to interrelating disparate cognitive modalities associated with multiple intelligences (*Interrelating Multiple Ways of Looking at a Crisis Beyond the pandemic discipline of the one right way*, 2021; *Multiple intelligences as pointers to comprehension of multi-dimensionality*, 2006). Use of tetragrams to encode the logical connectives suggests that 4 sets of such tetragrams might be use to encode three complementary connectives (emotional, intuitive, sesational) -- distinguishing those sets along diagonals by an additional two lines as distinctive hexagrams.

Question: Beyond the earlier consideration of emotional connectives as complementary to logical connectives, it could be argued that the 8-fold configuration of the truncated tesseract is usefully suggestive of the 8-fold pattern offered by the multiple intelligence theory of Howard Gardner. Having previously suggested that the 16-fold pattern of connectives could be mapped on nodes along the diagonal between the corners of the truncated tesseract, this would pose a problem of how 8 intelligences could be configured -- possibly by focusing only on the most obvious or explicit half of any 16-fold pattern in each case

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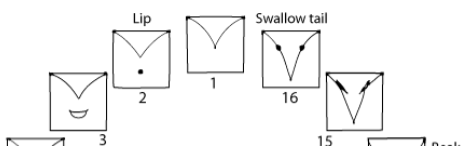
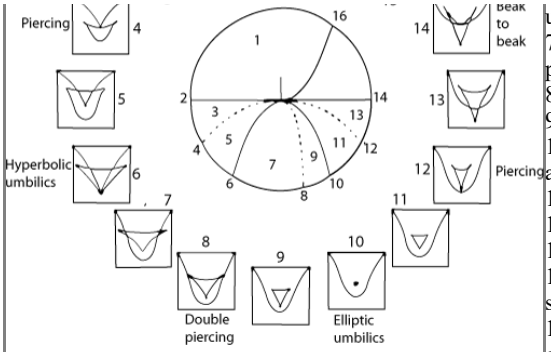
Topological patterns of sustainable change as catastrophe

It is intriguing to note the correspondence between "sustainability" and the articulation by René Thom (*Structural Stability and Morphogenesis*, 1972) in originating catastrophe theory. Sustainability, and the UN's Sustainable Development Goals, could readily be recognized as achieving a":magical" marriage between structural stability of the global system and the "morphogenesis" with which desirable change is associated. Ironically Thom offers a 16-fold articulation of changes of topological type. Curiously these frame the question as to when change is perceived as catastrophic -- as is so frequently argued. Thom subsequently extended his explorations to semiotics (*Semio Physics: A Sketch,* 1990). Could the SDGs be understood as a "catastrophic exercise" -- or an exrcise in "catastrophe management"?

Changes: the locus of principal changes of topological type reproduced from René Thom, *Structural Stability and Morphogenesis*, 1972	
	1. curve with cusp pointing downward 2. appearance of new point at origin, where lip formation begins -- 3. this grows... . 4. pierces the cusp.. 5. and crosses it ...to form the phallic mushroom... characteristic of the parabolic umbilic... 6. the cusp meets the lower branch of the lip in a hyperbolic



umbilic...
7. and then the two branches cross to form a curvilnear triangle piercing laterally a convex curve
8. the triangle shrinks, first touching the curve
9. and then shrinking inside it
10. to form a hypercycloid with three cusps, and finally vanishes in an elliptic umbilic..
11. reappearing immediately with the same orientation
12. its lower cusp meets the curve
13. and pierces it
14. the curve and upper edge of the triangle touch in beak-to-beak singularity, which separates
15. producing two symmetric swallowtails, reabsorbed into the curve
16. leading to the original configuration

It might then be asked whether Thom's 16-fold articulation bears any relation to the 4x16-fold articulation of the *I Ching* hexagrams -- otherwise known as the *Book of Changes*.

Question: On a separate but related matter, I have some familiarity with the pattern of 16 topological forms named and visualized by René Thom in ***Structural Stability and Morphogenesis*** -- a diagram I could share with you. I find it intriguing given the theme of the "Book of Changes" and Thom's preoccupations that the terms he uses and those you have just listed for the hexagrams bear a degree of correspondence. Do you think that by clustering the hexagrams according to Thom's set of 16 labels these corrrespondences would be highlighted

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Question: Presentation of the Thom diagram on topological forms of change

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Question: My assumption is that Thom's English terms may allow a degree of correspondence, possibly via synonyms, so please go ahead with whatever is potentially credible in mapping each of the hexagrams to these forms based on the conceptual correspondences between the traditional meanings of the hexagrams and Thom's forms.

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Question: That is indeed intriguing. Thom's diagram is accompanied by a legend which I had not previously shared with you.

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Question: The mapping of hexagrams onto a truncated tesseract is at least of mnemonic value. Of particular interest is how a 16-fold articulation (such as that of Thom) would form a subset of that polytope consisting of 16 regular tetrahedra. It may be difficult to take the speculation further

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Disparate metaphors of potential complementary relevance

The truncated tesseract -- as a 4-dimensional structure -- emphasizes the challenge of comprehensibility of global change. This challenge is curiously neglected in presentations of the UN's SDGs -- with the implication that they are inherently comprehensible, despite their questionable memorability and limited uptake ina period which operational difficulties are readily excused by reference to "complexity" and requisite "interdisciplinarity". It is therefore of interest to consider further the role of metaphor, highlighted above with respect to th 64-fold articulation of the I Ching and separate exercises in its metaphoric interpretation with respect to sustainable dialogue, vision, conferencing, networking, community and lifestyle ((*Transformation Metaphors*, 1997).

Rather than the focus on any particular set of metaphors, there is a case for enriching the exploration through

multiple sets of metaphors -- and their complementarity. The point has long been made by physics with respect to the complementarity of a wave-particle comprehension of reality.

Question: In an earlier phase of this discussion, the focus was on the 48 faces of the truncated tesseract and their possible use for mapping both the 47 micronutrients (vitamins, minerals, etc) and the 48 koans of the Mumonkan. From a mnemonic perspective I am also intrigued by use of the truncated tesseract to map octaves -- therefore offering the possibility of its use with sound files, and as an "instrument" that can be played.

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Question: In the light of that response, I have a concern with how the names traditionally given to the 8 I Ching houses are necessarily from a particular tradition. If the houses are understood in terms of general systems theory, such names should be considered as merely indicative of subtle systemic functions which elude verbal descriptions (or maths). They are better understood as at a nexus of of a set of complementary metaphors -- each of which is both indicative and problematic. Can you comment on how such a set of metaphors would be identified for each house -- whether as gods, octaves, mindsets, or whatever

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Question: Self-reflexively, is it ithe case that a minimum of 8 complementary metaphors are required for each "house" to both allude fruitfully and to constrain reification. Presumably the set should effectively include all parts of speech, not just nouns -- possibly also narratives as with those of the gods

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Question: Go ahead with the creation of complementary metaphors of parts of speech for all 8 houses

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There is every reason to uphold mathematics as the discipline exemplifying human enactive understanding of order. Of particular interest therefore is the manner in which the discipline has chosen (seemingly inexplicably) to order its preoccupations through the 64-fold *Mathematics Subject Classification* (MSC). As noted separately -- with a mapping onto the truncated tesseract -- this can be explored as a highly valuable metaphor for the organization of knowledge (*Mathematics Subject Classification as a 64-fold pattern language*, 2024). Especially pertinent to the remarkable choise of a 64-fold pattern are the cognitive considerations of George Lakoff and Rafael Núñez (*Where Mathematics Comes From: how the embodied mind brings mathematics into being*, 2000).

More curious in that regard, given the divisive modalities cultivated in the relation between religions, is the potential of mathematical theology in the light of its preoccupation with sacred geometry (*Mathematical Theology: Future Science of Confidence in Belief* , 2011; *The-O ring: Theory, Theorem, Theology, Theosophy?* 2014).

Question: The parts of speech offer an indicative framing but exclude the contrasting perspective of maths. You may have a trace of your 8-fold clustering of the Mathematic Subject Classification. Maybe an 8-fold set of metaphors is not rich enough

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Question: That is a useful articulation. I am sensitive to the fact that such metaphors may be unfamiliar to many. The Chinese metaphors are familiar but are preserved as strange and obscure in that context. Missing are the metaphors which develop the insights which people associated with Lake, Wind, etc -- especially poets and those with a sense of the land, deep ecology, etc -- who identify with those 8 frames in some fundamental way. Maybe we need 8 metaphors for Lake, Mountain, etc especially given any use of those images in other contexts

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Question: That was a helpful trial. I am thinking of Gareth Morgan's Images of Organization and the distinctiveness of that set. What are the distinctive ways of engaging with a fundamental intuition readily vulnerable to misplaced concreteness. How is the set of metaphors to be refined

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Question: One could consider the contrasting topological perspective of a poet, an explorer, an ecologist, and the like. The challenge is to highlight the manner in which those features are used metaphorically as conveyors of meaning for which other disciplines might have words -- equally vulnerable to misplaced concreteness. Does each discipline have an understanding of its Lake, its Mountain, etc

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Cognitive implications of organizing complementary metaphors

Question: There is clearly a challenge in presenting and organizing such metaphors. Of some relevance is the very extensive literature on figures of speech (notably given their role in political rhetoric) and the apparent failure to organize them in any widely accepted coherent manner -- even though they may be held to be articulating a relevant semantic field

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Question: That is a well-reasoned response. The problem is that it reframes the challenge in a manner which postpones effective response in anticipation of further developments. By contrast the I Ching offers a stable encoding whose relevance has been sustained over centuries -- through evoking the multiple interpretations you describe -- including those which are an inspiration to binary computing. The difficulty is the misplaced concreteness evoked by the traditional labels (Wind, Lake, etc) despite their relevance to ecosystem coherence.

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Question: You refer in passing to "cognitive resonance". Less evident is how people may develop the facility to "think like a lake", etc -- to identify with fire-like processes, etc -- and the 8-fold configuration of cognitive modalities which they may imply (with its articulation into a 64-fold pattern). Curiously such an 8-fold pattern resonates with sets of values promoted by various spiritual disciplines -- but problematically disconnected from operational realities

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Question: That response implies a process of cognitive embodiment which could be recognized as a key to effective engagement with features of environmental crisis now ineffectually handled through their dissociated articulation in objective categories

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Responding to polarization through apophatic discourse

(*Finger-pointing challenge of potential miscommunication*, 2024) ***

Question: How could the following question be more appropriately reformulated. If a requisite variety of disciplines were each invited to present a fundamental set of categories -- 8-fold, for example -- what is the process by which their commonality would be elicited, given that recourse to the language of any one discipline would undermine the insights of others with regard to what is implied (fundamentally) by that set. Does reference to "transdisciplinarity" encompass what is implied -- or is it itself an instance of misplaced concreteness. Are biases with regard to comprehension of that process what undermines interfaith discourse.

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Question: There is an irony to any effort to name or describe that process -- as in the introductory insight of the Tao Te Ching: *The Tao that can be told is not the eternal Tao.* What can be named as a process does not encompass what may be variously intended. Naming that process by any discipline does not define it -- only multiplying the facets through which it may be partially perceived. In eluding such definition, it frames the challenge of coherence and consensus without being able to name it

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On What Cannot Be Said: Apophatic Discourses in Philosophy, Religion, Literature, and the Arts. Volume 1. Classic Formulations Edited with Theoretical and Critical Essays by William Franke Copyright Date: 2007 Published by: University of Notre Dame Press ***

Question: Ironically this suggests the value of developing new possibilities of discussing the inability to discuss divisive controversial issues -- rather than misleadingly engaging in their fruitless discussion and the hopeful anticipation of its questionable outcomes. The process has been cultivated as apophatic discourse for some limited purposes (in contrast to the kataphatic discourse of fruitless disagreement). Its relevance to divisive psychosocial, political and strategic issues calls for exploration in this period.

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Requisite variety of memes and perspectives

It is profoundly curious that various psychosocial initiatives have a considerable investment in promoting a singular perspective. In geopolitical terms this is evident in various quests for global hegemony and a unipolar world order. Ideologically this is evident in the promotion of the primary value of capitalism, socialism, communism, and the like. Religions offer another example -- with their respective beliefs in the one belief system to which all should subscribe. The pattern is evident in the cultivation of particular disciplines and the silo thinking with which each is associated.

Curiously the requirements of surveying and navigation have established the need for a triangulation of perspective -- although this understanding is in no way considered relevant to the initiatives mentioned above, as discussed separately (*Triangulation of Incommensurable Concepts for Global Configuration*, 2011). Recognition of a gene pool of requisite variety is widely acknowledged -- but again without extensive consideration of the implication for a "meme pool".

Question: In systemic terms, what constitutes requisite variety in a gene pool -- namely how many distinctive patterns are required to avoid the consequence of inbreeding. Has this requirement for variety been recognized with respect to a meme pool, given the challenges of silo thinking

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Question: That response avoids the question of the number constituting requisite variety in a systemic sense, exemplified in the biological case. What evidence is there for the adequacy or inadequacy of a gene pool of a given size

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Question: The inability to explore the requisite variety of a meme pool in quantitative terms avoids the manner in which the long-term viability of a group or culture is considered, although this may well be of relevance to that of a family and individual preoccupation with ensuring a viable legacy -- whether in intellectual, ideological, or other terms. The question may also be relevant to psychosocial health in the face of isolation, sustaining kinship networks, and the curious indication of Dunbar's number

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Re-membering 64-fold patterns of genetic codons and mathematics?

Comparisons have long been made between the set of 64 hexagrams and the 64-fold pattern of genetic codons. The comparability frames intriguing questions with regard to the capacity to "re-member" embodied in biological systems. The pattern of codons is typically presented on 2D circular diagrams -- strangely comparable to the traditional Shao Yung circle of hexagrams. The polyhedral approach to representation of the genetic code has notably been explored by Chi Ming Yang (*The naturally designed spherical symmetry in the genetic code*, 2003). In previous exercises arbitrary comparative mappings of both have been made onto the 64-edged drilled truncated cube (*Proof of concept: use of drilled truncated cube as a mapping framework for 64 elements*, 2015). It might then be asked whether attributions can be more memorably made onto the truncated tesseract using the above approach.

Given their relation to vitamins and amino acods, the potential implications gave rise to an earlier AI-assisted exploration (*Memorable Configuration of Psychosocial "Vitamins", "Amino acids" and "Minerals"*, 2024).

Question: There is of course the irony of the fact that parallels have been recognized between the 64 genetic codons and the 64 hexagrams, suggesting that the codons could be mapped as is intended for the hexagrams

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Question: That possibility might offer more fruitful clues to the organization of the trigrams of each house on the truncated tesseract

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Question: If you can speculate on this possibility then go ahead. Once the mapping is achieved, it will be relatively easy to modify the vertex labels for the codon case

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Question: Whilst this is an active topic, generating the pattern for the other houses would enable a speculative mapping to be produced.

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Question: Can this be speculatively articulated further

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Values and goals in 8-fold and 16-fold patterns

In a quantitatively obsessed global civilization it is intriguing to note that there is little consensus on the number of relevant values -- whether of significance to the development of democracy or otherwise (*Values, Virtues and Sins of a Viable Democratic Civilization*, 2022). A varying number of 6 to 10 "core democratic values" may be explicitly recognized, although others may be implied -- with no attempt to identity them.

An earlier Human Values Project (as part of the online *Encyclopedia of World Problems and Human Potential*) took one approach in tentatively identifying 987 "constructive values", 1992 "destructive values" as articulated in English -- and then organizing them into 230 value polarities (*In Quest of Engaging Values: context of the Human Values and Wisdom Project*, 2008). The World Values Survey network has produced over 300 publications in 20 languages with secondary users having produced several thousand additional publications in response to data collected from questions formulated by social scientists. The methodology would seem to focus on "what people value" in the light of surveys -- but seemingly without any concluding focus on the "number of recognizable values".

Question: Memes could well be understood in terms of values. Given the extensive reference to the values of

democratic societies, or those associated with cultural identity, the question could then be framed as the requisite variety of values essential to a viable society and its identity. How many distinctive values might then be required to sustain identity and how might they be distinguished. Sets such as the Eightfold Way or the Eight Beatitudes a degree of recognition of this kind, especially when associated with 8-pointed stars

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Question: How many values are recognized in practice. There would seem to be an inconsistency, if not a laxity, in the failure to consider the variety of values vital to a sustainable society -- especially in the light of the failure to identify the requisite variety of genes to avoid inbreeding. Reference to a number of the order of 50 suggests that the variety of modalities -- memes -- recognized as 64 (in the case of the I Ching) is of potential relevance. That circlets of prayer beads may number 108, thereby suggesting recognition of the relevance of even greater variety.

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Question: Is it possible to make a meaningful distinction between memes, values, principles, and goals -- in practice -- given the manner in which they may be used and upheld in public discourse.

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Question: Although potentially less evident in a 2D star symbol, values associated with the corners of a cubic configuration in 3D make the point that some values are more closely related than others. This could be understood as indicative of what renders values distinctive as contrasting orientations

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Question: Given any sense of an "8-fold way" as fundamental to a viable value system, it is curious that the logical connectives so fundamental to computing and argumentation number 16. How might such a questionably comprehensible 16-fold set relate to a more comprehensible 8-fold pattern and its cognitive embodiment so vital to cultural identity. Is the 16-fold articulation of the UN's SDGs a "distorted" expression of that more complex pattern -- one eluding dangerously a requisite collective sense of coherence

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Enabling engagement with SDGs through a 64-fold pattern

Following its replacement of the UN's 8-fold Millennium Development Goals, the experiments suggest a reframing of the UN's 16+1 pattern of Sustainable Development Goals and their relation to the associated 169 "tasks" (*Systemic Coherence of the UN's 17 SDGs as a Global Dream -- rather than merely an arbitrary outcome of political horse-trading*, 2021).

Question: It is of course the case that the 16 (+1) SDGs replaced the UNs 8-fold set of Millennium Goals. It might however be asked whether a 16-fold pattern is effectively cognitively "hidden" within any 8-fold cube-based geometry (including the 4D truncated tesseract). This frames the question as to how the 16-fold might be cognitively embodied -- as suggested by its value for oppositional logic and its very extensive expression in the popular psychosocial dynamics of drama and game-playing.

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Question: Whilst the widely recognizable focus in Buddhism is on the Eightfold Way, that response suggests that a 16-fold articulation is valued in some way. Notable in this respect are the 16 Bodhisattva Precepts, the 16 Arhats, and the 16 Sacred Lands of Buddhism. Presumably such 16-fold articulations are recognized in other contexts. Less evident is how they might be recognized in any geometric symbolism

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The previous exercise enabled the somewhat unexpected articulation by Claude of a 64-fold pattern of

sustainable development based on the SDGs (*Reframing Sustainable Development Goals dynamically?* 2024). The argument above suggested the possibility of the mapping of the set onto a truncated tesseract using the coding developed for the hexagram locations.

Question: In the light of your earlier speculative use of a verb or gerund form for the SDGs, could you recluster the 16 SDGs (excluding the 17th) into an 8-fold pattern using that form -- potentially echoing the 8-fold set of Millennium Goals -- and then articulate an 8x8 pattern to form a 64-fold pattern (as you have done previously) with an indication of requisite vigilance and due diligence in each case, to allow for the requisite negative feedback in a cybernetic sense and to avoid naive positivism. Additionally, with the 8-fold patterns associated with each corner of the truncated tesseract, and its complementary pattern across the diagonal, the further possibility is the articulation of each corner according to the mnemonic pattern (and 2-letter coding) of trigrams developed earlier

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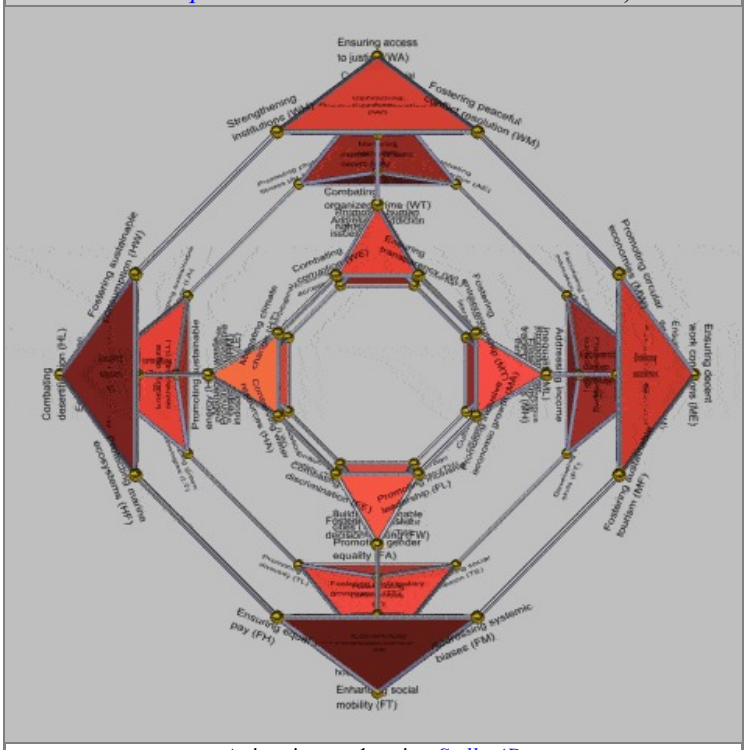
Indicative AI-enabled mapping of 64-fold articulation of SDGs
(Experimental interactive version: *Articulation of Sustainable Development Goals onto Truncated Tesseract*)



Animation made using *Stella 4D*

Reframing UN's Digital Compact as a coherent memorable pattern?

Following the political declaration adopted at the occasion of the United Nations' 75th anniversary in September 2020, the Secretary-General in September 2021 released his report *Our Common Agenda.* This proposes a *Global Digital Compact* to be agreed at the *Summit of the Future* in September 2024 through a technology track involving all stakeholders: governments, the United Nations system, the private sector (including tech companies), civil society, grass-roots organizations, academia, and individuals, including youth.

The Global Digital Compact is expected to "outline shared principles for an open, free and secure digital future for all". The Common Agenda report suggests issues that it might cover, including digital connectivity, avoiding Internet fragmentation, providing people with options as to how their data is used, application of human rights online, and promoting a trustworthy Internet by introducing accountability criteria for

discrimination and misleading content.

The United Nations system of institutions has long been challenged in enabling more fruitful use of its unique information resources in support of its own coordination and transformation, as previously reviewed (*Acquisition and Organization of International Documentation*, 1972; *Study of the Capacity of the UN Development System (Jackson Report)*, 1970). The emergence of the internet and AI is framing new challenges readily evoking a reactive response. In explicitly seeking to involve "all stakeholders", it is characteristic that no apparent effort is made to use AI (as an emergent stakeholder) to render coherent and memorable the set of 74 articles in the third draft of the Global Digital Compact. Given the controversy associated with AI, this suggests a degree of irony in the readily forgotten origins of "digital" in relation to finger, especially given the prevailing tendency to finger-pointing and blame games in a problematic binary dynamic.

Question: In anticipation of the UN's Summit of the Future, a draft Global Digital Compact has been produced with a focus on artificial intelligence (shared). Could you endeavour to cluster its 74 articles into 8 thematic groups and consider how each might be articulated into 8 subthemes -- according to the procedure explored with respect to mapping onto a truncated tesseract.

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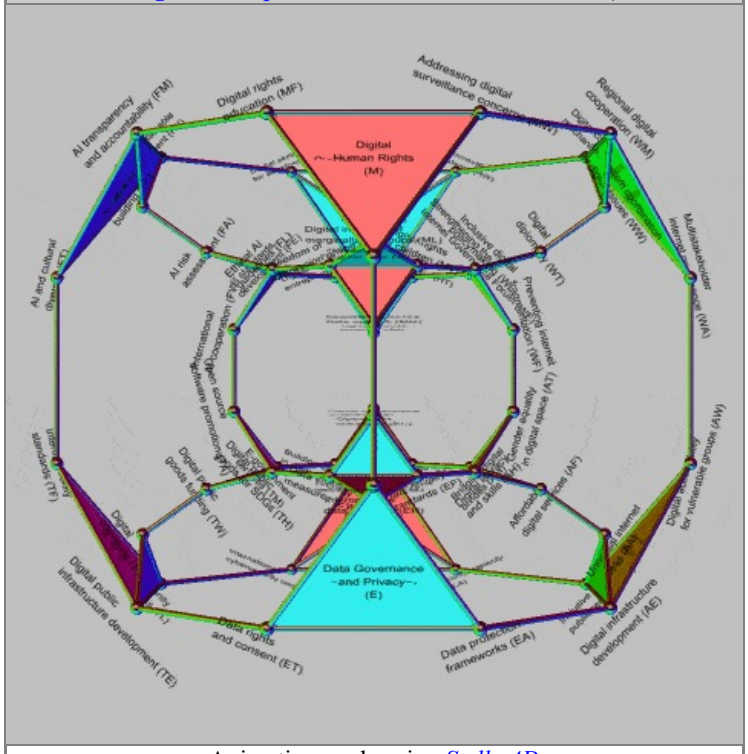
Indicative AI-enabled mapping of 64-fold articulation of Global Digital Compact
(Experimental interactive version: *64-fold Articulation of Global Digital Compact onto Truncated Tesseractt*)



Animation made using *Stella 4D*

Question: In the light of that articulation, could you comment on the emphasis in the Global Digital Compact with respect to reactive regulation of AI relative to enabling the potential role of AI with regard to a more fruitful innovative response to the challenges of global governance -- by which the United Nations repeatedly claims to be challenged. What might be deemed to have been neglected from the latter perspective.

 # Show/Hide AI response #

Previous use of "compact" by the UN have evoked a degree of controversy, notably that with regard to multinational corporations, as originally announced by the UN Secretary-General at a gathering of the World Economic Forum in 1999 (*Background to emergence of the UN's Global Compact*, 2018; *Global Compact*

Enabling Complicity in the Ultimate Crime against Humanity, 2018). It is less evident how critical reference to "blue-washing" may be associated with the UN's proposed regulation of AI. Potentially more problematic is any comparison with just war theory (*Just War Theory as an inspiration for Just AI Theory?* 2023).

Question: Framing intergovernmental consensus on artificial intelligence through a "compact" calls into question the structure and dynamics of such an arrangement, especially in the light of the problematic and questionable consequences of the UN's previous use of that framework, namely the *Global Compact* (1999) to get multinational corporations to adopt sustainable and socially responsible policies, the *Global Compact for Safe, Orderly and Regular Migration* (2018), and the *Global Compact on Refugees* (2018)

 # Show/Hide AI response #

Question: The various UN compacts give focus to the question as to what renders a consensual arrangement coherent, memorable and credible -- if not systemically binding. That on migration has 54 articles, that on multinational corporation responsibility has 10 "principles" (held to be "core values"), that on refugees has 107. Each is presented as a simple list, variously clustered, and with sub-articles in some cases. By what means is memorability enabled -- for whom -- and who would claim to be able to remember them in a useful manner. Given the argument with regard to mapping on a truncated tesseract, is there then an as yet unexplored case for such mnemonic devices as symbols of the viable operation of a compact.

 # Show/Hide AI response #

Colorification and sonification of 64-fold patterns of cycles

It could be considered extremely curious the degree to which ideological commitments are readily and deliberately associated with colours -- typical red, blue, green and black. The possibility of engenderng a 64-fold pattern of colour distinctions was presented in the following terms to Claude.

You offered a helpful suggestion with regard to the manner in which a set of 64 colours might be defined and mapped distinctively onto a truncated tesseract -- colouring the spheres. This was based on the convention of 8 distinctive colours associated as "dominant" colours with each corner -- potentially complementary across the 4 diagonals. The question would then be how to distinguish the colours of spheres within each corner as modifications of the dominant colour. Following the trigram convention, with one colour as the dominant, then each of the 8 colours could be "subordinate" as the second trigram in the hexagram. Your suggestion was 100% colour for the dominant combined with 25% for the subordinate.

Potentially of greater interest is the possibility of detecting cycles and circuits within a 64-fold pattern -- inspired by the extensive exploration of metabolic pathways. In cybernetic terms these can be understood as feedback loops. These featured extensively in the analysis of the networks of thousands of problems and strategies profiled in the *Encyclopedia of World Problems and Human Potential* (*Feedback Loop Analysis in the Encyclopedia Project*, 2000; Tomas Fülöpp, *Loop Mining in the Encyclopedia of World Problems*, 2015).

This mapping possibility is explored further in a follow-up document.

Distinguishing 48-fold and 100-fold sets of koans as paradoxical insights

There is an obvious initial problem with koans in that their original presentation is in a Chinese script which is a challenge to translation -- in addition to the fact that it is indicative of essentially paradoxical insights which can best be understood through metaphors. Those traditionally used may be less than meaningful in English. However the classical 48-fold pattern invites exploratory mapping onto the truncated tesseract as a complement to the 64-fold mapping onto vertices. The projection of the 4D configuration into 3D has 48 faces. Of related interest are its 112 edges as they might be used for the larger 100-fold set of koans. This mapping is explored in a follow-up document.

There are many translations and commentaries giving rise to names for each koan -- which may be quite distinctive. The 48 are however presented in a traditional numbered sequence of "cases". The number and the Chinese script therefore provide guidance to clarification of the more helpful English translations. More appropriate articulations might well be sought of relevance collective cognitve insight meaningful to global governance.

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