The two meanings for modern intelligent design

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The modern meanings for the notion 'intelligent design' are often confused since there are different theories that model this concept. In this article, the meanings accorded the words 'intelligence' and 'design' are given for the two modern theories that investigate the 'intelligent design' of physical-systems—Restricted Intelligent Design and General Intelligent Design. Once 'intelligent design' is defined for each theory, the theories are compared and the physical and philosophic significance of each is explained.

For modern physical science, what does the expression 'intelligent design' signify? For this phrase, there is a considerable amount of misinformation being disseminated. Wikipedia states, 'Intelligent design is the claim that certain features of the universe and of living things are best explained by an intelligent cause, not an undirected cause such as natural selection.'[1] This definition is taken from the website of the Discovery Institute.[2] The entire Wikipedia article is misleading in all respects, since there are *two* modern theories of intelligent design *Restricted Intelligent Design* (RID) (1998)[3] and *General Intelligent Design* (GID-model, or GID) (1979).[4–6]

The Discovery Institute only popularizes RID. The Wikipedia article only presents aspects of RID and leaves the impression that there is merely one modern theory of intelligent design. This is a false impression. Regarding the physical-science merits of RID, the criticisms presented are often correct. However, none of the stated RID criticisms holds for the GID-model. In this Wikipedia article, the concepts termed as 'intelligence' and 'design' lack specificity. Further, the article argues that the RID notion of intelligence is only inferred. This is a correct aspect of RID. Without specific definitions for the two words in the phrase 'intelligent design' that follow physical-science protocols, 'intelligent design' cannot be considered as possessing significant physical-science content. This is the case for this phrase as presented in Wikipedia.

The design notion

There are eight dictionary definitions for the word 'design'. These include '(1) a plan; scheme, project. (2) purpose; intention, aim. (3) a thing planned for.'[7] Each of the first six statements implies that a design is something produced by an intelligent being. If any of these first six apply, then the use of the modifier 'intelligent' is redundant. Consider definitions '(4) the art of making designs or patterns' and '(5) the arrangement of parts, details, form'. For (4), the use of the word 'art' may or may not imply that a reasonable amount of intelligence is involved. This is the first of these statements that includes the word 'patterns'. Statement (5) mentions 'arrangement' and does not imply that an intelligent being produced such arrangements. For a definition of the phrase 'intelligent design', the term 'design' needs to be consigned to the idea of 'pattern', where the notion of 'intelligence' characterizes patterns in some special manner.

Since for the purpose of this article physical objects and physical behaviours are the primary application for this concept, a 'structural' pattern that is akin to the definition of a 'physical-system' is an appropriate type. 'A physical (natural) system is a defined collection of named physical objects, the constituents, which are so related as to form an identifiable whole. Specific relations between the constituents are the bases for establishing the behaviour of the entire structure.'[8] A 'name' is an identifier and the 'relation' may be as general as associating each constituent with some comparable parameter or with defined behaviour; or, the combination can be related in that it occupies merely a given space-time region. A definition for 'design', using the word 'pattern', is presented in two steps. The first pattern—the *structural pattern*—corresponds to the first sentence in the definition for a physical-system.

It is evident that the definition process must cease at some point and further comprehension is intuitive in character. This is even a fact within mathematics, a subject that is often concerned only with patterns of written symbols and how they are combined. When individuals are instructed in the meaning of the 'commutative law' for

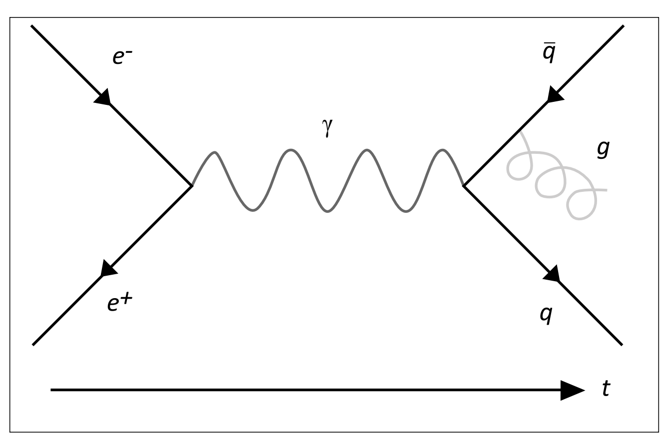

Image from <www.wikipedia.com>

Figure 1. Feynman diagram for electron-positron annihilation. Such a diagram cannot be produced by a machine alone, but requires human mental processes or inteligence.

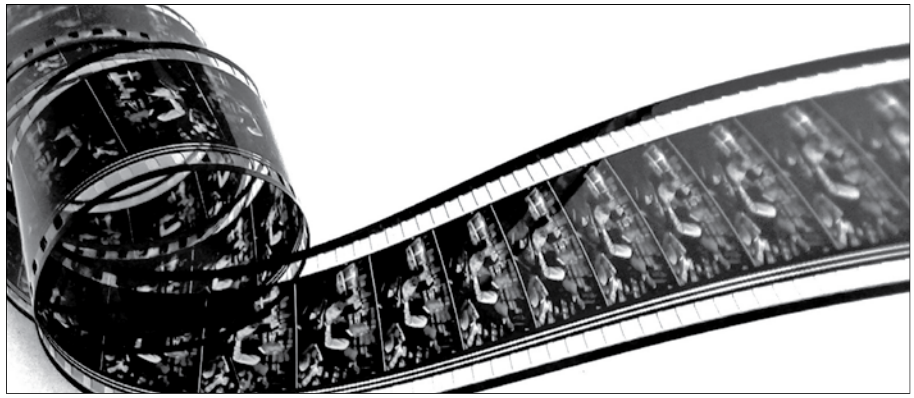

Figure 2. A collection of images in a film represents a *behavioural pattern* made up of individual frames or *structured patterns*.

operations and corresponding symbol manipulation, they might first be given a definition for the symbol '='. Then they might be told that a binary operation | is 'commutative' if for each A, B, A|B = B|A. The instructor may discuss the vector cross-product and matrix multiplication where this ordered statement need not hold. An individual needs to know that expressing strings of symbols in a left-to-right manner may or may not yield the same value if expressed in a right-to-left manner. Some mathematics and physical-science notions are described via the human 'two-handed' characteristic. There is a textbook that additionally describes a 'left-hand δ-paving' by inserting a drawing of a human left-hand into a 'paving' diagram.[9]

What constitutes a structural pattern is that such patterns are specifically described using an acceptable community symbolic or 'image' language. Human mental processes are involved since if the list is descriptive, then the terms must be meaningful to community members. The same is the case when diagrams or images are employed. In modern physical-science, many images that depict physical events cannot be obtained through direct observation by an image-producing machine. Human mental processes may first be used to produce a diagram or image, for example consider a Feynman diagram (see figure 1).[10] The notion of 'intelligence' is reserved for 'how the patterns came into being.'

For an example of a descriptive structural pattern for a biology-community, consider 'microspheres are composed of proteinoids'*. For an explicit image example, consider an optical micrograph of microspheres.[11]

The second sentence in the physical-system definition is related to the second type of pattern for this 'design' definition. This is the idea that there are 'patterns for behaviour'. A *behavioural pattern* consists of a collection of structural patterns, where they are compared via various parameters. The structural patterns either differ in some describable manner or they do not, and nothing else is stated at this juncture. If a behavioural pattern is formed by a collection of images, then a machine might be able to determine whether the images match.

For an example of a behavioural pattern, consider a piece of motion picture film containing microscopic images of cell growth. Each frame of this film represents a structural pattern and the entire collection of frames represents a behavioural pattern (figure 2). Relative to patterns, the term 'design' used in the following sections is liberally defined as being a structural or behavioural pattern.

Surmised intelligence

The notion of 'intelligence' may require a design to be selected for a describable 'purpose or aim or function.' Dembski writes, 'Specification in biology always makes references in some way to an organism's function.'[12] In many cases, such functionality is biological in character and corresponds to an aim or purpose. Webster defines 'purpose or aim' as '(1) that which a person sets before himself as an object to be reached or accomplished; aim, intention; design. (2) end in view; the object for which something exists or is done.'[13] Definition (1) is used to describe, partially, a form of human intelligence that formulates and describes purposes or aims for various designs.

For the remaining aspects of what constitutes this form of intelligence, human mental processes employing an appropriate language lead to a choice from a collection of descriptions for purposeful designs. The one chosen is for a design that satisfies a specifically defined function. 'Intelligence' characterized in this manner is called *surmised intelligence*. That is, an agent that exhibits surmised intelligence is assumed to possess intelligence based upon choosing a specific design that satisfies a described purpose. No scientific measurements or characteristics indicate specifically that surmised intelligence is being applied.

For example: a group of individuals comes upon two boxes: one red and one blue (figure 3). Each box has an opening at one end. Each individual observes five mice entering each box through this opening. Those that enter the red box rapidly emerge. Eventually all five mice enter the blue box. None of the mice exit the blue box for two hours after the last has entered. Each individual observes this specific behavioural pattern and each infers that the blue box is a type of mousetrap. However, the blue box could actually be designed for an unobserved purpose such as an experimental 'transporter'.

Surmised intelligence produces controversies because such intelligence is not revealed through 'logical demonstration'. Community G argues that a selected design reveals surmised intelligence. Community E argues that the same design does not reveal surmised intelligence due to a necessary additional feature. One example should suffice

* Technical terms are defined in the glossary.

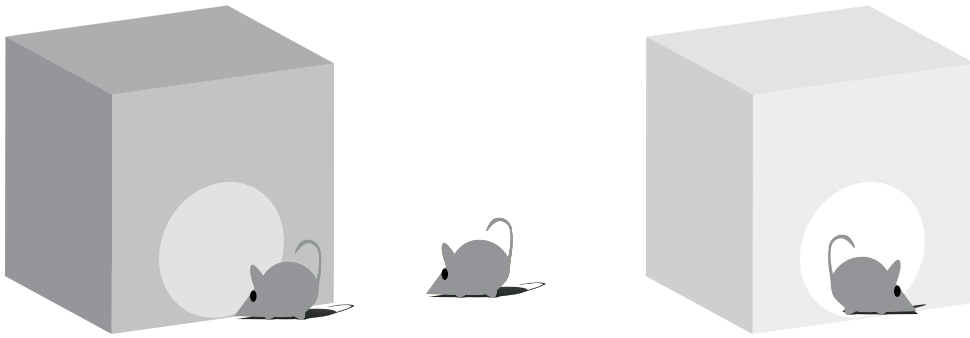

Figure 3. A surmised intelligence observation. When mice do not exit a box for two hours, the observers make inferences about what has happened inside the box.

to illustrate this point. Consider irreducible complexity. Dembski states, 'A system is irreducibly complex if it consists of several interrelated parts so that removing even one part completely destroys the system's function.' A standard example is the basic mousetrap composed of a platform, a hammer, a spring, a catch and a holding bar. If any one of these components is removed, then the device will not function as a mousetrap. It is the object's specified purpose that indicates surmised intelligence. For RID, the term 'complex' indicates that, within our universe, it is highly improbable that such a device will form, from its constituents, through the application of any specifically categorized physical processes. But, an identified irreducibly complex biological system is not interpreted by members of community E to be intelligently designed, since in their view an intelligent construction would include a 'backup system'. A basic example is the bacterial flagellum. Although members of community E may not be able, as yet, to predict various biological designs from their accepted theories, such designs would not be classified as displaying a type of 'natural-intelligence' unless they reveal functional redundancy. Irreducibly complex designs do not exhibit the necessary redundancy and members of community E reject the 'intelligent' modifier. Dembski states that (specified) irreducibly complex designs are examples of his notion of designs exhibiting specified-complexity. Surmised intelligence is implied and can vary with training in that one individual is trained to recognize that structural patterns satisfy a specific purpose while another individual who lacks such training does not recognize their purpose.

Typically, modern secular philosophies of science do not include the notion that a 'purpose' is associated with an intelligent desire to achieve a goal. For them, associating such purposes with an intelligent agency is an external and irrelevant connection. One example should suffice. In the subject Quantum Logic*, there is a specific notion called the Mittelstaedt conditional. The Mittelstaedt conditional* is compatible with a classical-styled logic-system*. However, in Quantum Logic one is warned to ignore the fact that the Mittelstaedt conditional represents intelligent deduction. On the other hand, the terms 'purpose', 'aim' and 'function' can be part of a community's vocabulary and their usage justified apart from the assumption of an intelligent agent that is a normally implicit in the terms.

The use of the word 'intelligent' does not signify that individuals who use this word do not apply the basic canons of the scientific method. The only diverse feature may be that other science-communities do not modify members of a list of causes for specific designs with the word 'intelligent'. This lack does not mean that the term 'intelligent' cannot be included within a list of science-community terms. But, if by an appropriate means a specific form of universe-generating intelligence is measurable, then all science-communities should accept the term 'intelligent' as meaningful.

Restricted Intelligent Design

In this section, for the phrase 'intelligent design', the noun 'design' means structural or behavioural patterns and the word 'intelligence' signifies surmised intelligence. An intelligent agency (i.e. action), via an intelligent agent (i.e. initiator of the action), is assumed to produce a surmised and intelligently designed pattern.

For an event E, a chosen description D* that corresponds to an observed design is selected using surmised intelligence. Additionally, the selection is partially based upon the following criteria. For a science-community, consider a list M = {all known and verified physical laws and physical-science theories that they classify as physical regularities}. Let C = {all other accepted and verified chance-related probabilistic models for physical behaviour such as those that use probability density functions to predict behaviour}.[19] Set C 'applies only to agents who believe that they have a complete list of the chance processes that might explain E'.[20]

For an unconditional RID conclusion, the set C is exhaustive. However, this property cannot be verified and it is a fact that the contents of M or C are altered by certain science-communities. Although there seems to be a controversy as to how one describes the sets M or C,[21] members of M or C can be accepted by a science-community as depicting physical behaviour without any further requirements. Moreover, along with the 'regularities' requirement, members of M are given a probabilistic component by stating that designs produced by them are 'highly probable'.

(1) Analysis implies that the specified design represented by D* is not, in a general sense, the result of relevant members of M. For the members of C, an entire relevant subset R is considered. (2) Statistical arguments are mounted that tend to show that it is extremely improbable that R in its entirety can produce the design represented by D*. This is the notion of 'complexity' as used in RID. Complexity corresponds to improbability. But, the design is not improbable in an unconditional sense. Under a philosophy of science stance that may not be tenable, all RID improbability statements signify that it is highly improbable that any member or members of an entire 'chance category', as represented by all relevant members of C, produce the design.[22] The fact that D* describes an actual design is coupled with (1) and (2) and, by implication, intelligent agency remains as the viable cause.[23]

The RID approach is termed as 'restricted' since the conclusions regarding intelligent agency apply to comparatively few designs. And, neither members of M nor C are RID intelligently designed. Moreover, a large group of scientists consider *all* designs to be fundamentally the result of probabilistic chance behaviour. For them, RID has no content and is meaningless.

Unconditional RID conclusions are dependent upon complete knowledge in that all physical-system probabilistic behaviour is describable, via a relevant symbolic language or images, through application of human intellect.[24] This requirement may be untenable for a specific design since C need not be exhaustive but may only appear to be so. This sentiment may have been explicitly stated by Dembski.[25] Invoking the notion that set M may be incomplete or all the relevant members of C may not be known greatly weakens any RID argument for intelligent design. Purposeful choice has no explicit definition that can, in the customary sense, be scientifically measured or characterized.

It is a statistical analysis relative to R that leads to the RID improbability conclusions. Due to a lack of a scientific definition for 'intelligence', RID is rather incompatible with the basic canons accepted by the majority of the physical-science communities. This does not mean that a science-community cannot include RID within its canons.

There is more than one philosophy of science and organizations can alter their canons. Retaining all of the common canons but including arguments for a list of purposes, if identified as such, certainly should not be considered as a weakening of a scientific method. To choose RID as a justification requires philosophic and empirical considerations rather than exact rational demonstration. Significantly, there is no RID approach that can rationally identify an intelligent agent as a 'higher-intelligence'.

Since RID conclusions correspond to no mechanisms described by members of M or C, then some positive RID conclusions might be useful to secularists who accept the stochastic process philosophy*. Such RID conclusions could foster research activities that might lead to appropriate mechanisms that, when added to M or C, eliminate various RID inferences.

General Intelligent Design (GID)

The original (1979) mathematically based theory for intelligent design investigates the verb 'to design' rather than the noun form of 'design'.[4,5;28–30] Mathematically characterized intelligence is investigated using 'physical process relations'. These are binary relations where each member relates a first object description or image to a second object description or image. They represent the known physical processes that, when applied to the first described object, yield the second described object. This corresponds to the verb 'to design'. Independent from the patterns produced, all known scientifically verified physical process relations are intelligently designed since they correspond to specific logic-systems. The physical designs produced are not *ad hoc* or haphazard applications of physical processes but are intelligent applications. Each scientifically verified physical process that produces or alters the behaviour of a physical-system is GID intelligently designed. The consequences of such processes, both the production of a physical-system and alterations in its behaviour are also GID intelligently designed. Expressed in terms of patterns, all specifically described and verified structural and behavioural patterns are produced by intelligent agency.

Since the original theory is distinct from RID, its name was changed to the 'General Intelligent Design Model' (GID). RID cannot supply any physical mechanisms that lead to the designs investigated.[29] For RID to apply unconditionally, one must have relevant and complete describable knowledge. However, the maximum GID-model, as presented in this article, is independent from the actual content of both M and C. All that the GID-model requires is that the members of both M and C be obtained via basic logic-systems. Obviously, RID neither predicts nor gives a 'better' explanation for behaviour based upon physical terms only. RID is not falsifiable in the Popper* sense. The GID-model is scientifically testable and falsifiable and is an interpretation of a Theory of Everything—the General Grand Unification Model (GGU-model).

For this article, the GGU-model is not discussed in detail. However, generally and in a direct manner, the GGU-model uses mathematical operators (i.e. functions) that mimic collections of physical processes; processes that either produce or alter the behaviour of physical-systems within a universe. These operators produce structural or behavioural patterns. In particular, each operator is applied to a description or an image that *represents* either the actual physical-system constituents, or the physical-system as a whole. Then the operator produces a description or image that represents either a physical-system composed of the constituents, or alterations in the physical-system's behaviour. The operator ***S** is applied to a physical-like object and the result is a set of structural patterns that are represented by descriptions or images. This set contains representations for the constituents of 'time-developing' physical-systems.

Each accepted physical law or verified physical theory is represented by a GGU-model operator and this collection of operators produces the detailed designs for physical-systems governed by such laws and theories.[30–36] The operator ***S**, as mathematically obtained from defined operator S, is the basic operator used to produce our universe as an entire entity. The construction of the GGU-model follows the rules for the mathematical modeling of physical-systems and is an acceptable physical theory. How does the GGU-model relate to an exact definition for intelligence?

Each GGU-model physical-system generating operator has certain meaningful characteristics that yield the GID interpretation. The notion of 'intelligence,' as modeled by the GID-model interpretation, is explicitly related to agency or to an agent. The GID-model interpretation determines whether an action, independent from the design produced, is an intelligent action.

The GID-model interpretation is distinct from the physical process interpretation. Further, there is a vast amount of direct and indirect evidence that supports the GID-model interpretation.[37] For the GID-model, the meaning of the term 'pattern' is the same as for RID. Basically, two types of GGU-model operators are used. The first type satisfies three characteristics. An application of this type of operator is the first step in the production of or alteration in the behaviour of a physical-system. Distinct from the physical results, the three axioms also model the most basic properties associated with deductive thought.

The stated mathematical characteristics for the first type of operator are equivalent to an informal set of statements termed a *general logic-system**.[38,39] The most significant statements are the following:

A) It is required that individuals mentally follow a set of rules applied to members of a language, where a language is a constructed collection of symbolic forms or images.
B) It is required, as done in formal logic, that individuals mentally make choices from a set of symbolic forms or images that may be potentially infinite.
C) It is required that individuals mentally compare a finite set of specific symbolic forms or images with a fixed list of symbolic forms or images contained in a 'general rules of inference' and, when the forms or images correspond exactly, to select related symbolic forms or images. [A 'general rules of inference' is a specific mathematically defined collection of relations.] This comparison and selection process is repeated.
D) When applied to the physical world, it is required that individuals determine mentally when the selections made in (C) yield symbolic forms or images that represent the production of or alteration in the behaviour of an identified physical-system. This requires an additional finite-choice step.
E) There are finitely many steps in the algorithm that yields a (C)-selected symbolic form or image. Each step has a describable algorithmic reason for the selection. [If an operator, such as S, is applied to objects that represent physical-systems, then, due to the mathematical equivalence, all results are produced by an intelligent agent with properties informally modelled by (A)–(C), (E).]

It is important to realize that, for physical behaviour, the (A)–(E) descriptions should be considered as but a *model* for mental processes. Based upon knowledge of a set of axioms, a mathematician writes down a statement 'From P, the consequence Q follows.' The facts are that, usually, 'after' this statement is made a 'proof' is constructed in order to justify to others that specific 'rational' processes can be applied so as to deduce Q. In mathematics and for physical-science derivations as well, the justification follows steps (A)–(E), where these steps model a GID 'signature'. Using a specific proof or physical derivation, others can verify the conclusions rationality.[40]

In order to continue the GGU-model processes, additional types of mathematical functions are utilized.[41] For example, a mathematically derived 'finite-choice' operator models statement (D). The basic aspects for the GID definition for 'intelligence', in its standard form, correspond to the significant mental procedures that are informally modeled by statements (A)–(E). Individuals often perform these five procedures in the discipline of Mathematical Logic. The three *finite consequence operator* axioms are equivalent to (A)–(C), (E). When the structural or behavioural patterns are obtained by application of a finite consequence operator, the finite-choice operator eliminates extraneous deductions. This yields the behaviour-signature—a relation that compares the original constituents or structural patterns with the produced results. Restricting the finite consequence operator's values to a fixed subset of the language being used can eliminate all extraneous deductions and (D) is eliminated. This yields the behaviour-signatures directly.

Since statements (A)–(C), (E) are informal consequences of a set of mathematical axioms, the mathematical axioms are also said to yield a 'signature' for intelligent design. Distinct from RID, GID intelligent design signatures are exactly defined and they correspond to a representative model described by (A)–(E), where the steps (A)–(E) can be confirmed explicitly. Technically, each described and verified physical law and each scientific theory is representable by a finite consequence operator.

Applications of the modelled physical laws and modelled scientific theories also require that either a language restriction or a finite-choice operator be applied. It is when these finite consequence operators are so constrained that GID physical behaviour-signatures are generated. These behaviour-signatures yield the intelligently designed physical process relations.[39]

Usually, the actual linguistic construction for verified scientific theories can be explicitly shown to follow, at least, the above (A)–(E) characteristics. However, as with empirically determined physical laws, if a scientific theory is vaguely stated so that only the physical process relations are generated, then these relations can specifically define a behaviour-signature. Each behaviour-signature defines a logic-system to which (A)–(E) applies,[42] where the D step is automatically achieved. Consequently, all verified physical laws and scientific theories are established as intelligently designed via GID.

The coupled GGU-model and GID processes are as follows: in a manner similar to theory construction, but in more detail, there is a 'higher-intelligence' **H** that designs the operators that detail and represent physical processes. Once constructed, the mathematical operators, at least, represent each member of the set of all science-community physical laws and scientific theories such as members of either M or C. After application, each such operator is restricted to a previously selected portion of the language and this generates a behaviour-signature finite consequence operator with the defined GID intelligent agent characteristics.[43] For any other case, the behaviour-signature is directly obtained. For a verified physical theory or law, what an intelligent agent behaviour-signature does is to produce directly a physical-system from its constituents or directly produce an alteration in the behaviour of a physical-system without individual application of any other operator and without any additional 'extraneous' deductions. There is a final and rather technical process that is modeled after the human ability to collect finitely many objects. This final process uses the information contained within the descriptions or images to produce the physical results being depicted. However, there is one attribute that seems to guide much physical behaviour and that has not, as yet, been considered.

Physical theory predictions that have statistical components require an additional step when an actual physical event occurs. This means that although the production of or alterations in the physical behaviour of a physical-system are intelligently designed, the actual real occurrence of a collection of such designed events is controlled statistically. When necessary, an intelligent agent P controls this additional statistical requirement for the GID-model. However, this agent is classified as a 'pure higher-intelligence'.

A 'higher-intelligence' is partially characterized by (A)–(E) but each mental activity stated also applies, at least, to the 'hyperfinite' world,[44] a non-standard notion. Intuitively, such intelligence can usually be characterized as 'more powerful' than the intelligence displayed by any biological object that displays (A)–(E) intelligence. *Ultralogic* operators represent a higher-intelligence. For example, in statement (E) the word 'finite' is replaced with the word 'hyperfinite'. If (E) is compared with the modified version, then intuitively a nonfinite collection of steps can be utilized by a higher-intelligence for a logical argument as easily as human beings use but finitely many steps. The higher-intelligence can also replicate human thought processes. For the specific case of controlling statistical behaviour, the ultralogic P that rationally exists cannot be completely described in logic-system form via a standard language. A complete general logic-system for P exists mathematically and is indirectly verified from the predicted evidence.[45]

In general, it is not necessary to employ GID statements specifying that definable intelligent agents produce designs. The GID-model is but an additional interpretation of the GGU-model and, as with the Quantum Logic example, this interpretation can be ignored and considered as but an irrelevant artifact. On the other hand, the GID-model satisfies all of the required scientific protocols. The higher-intelligence interpretation is indirectly verifiable and it is a falsifiable scientific theory with a vast amount of available evidence. It can be accepted based upon these criteria. A science-community can reject RID because it does not follow their scientific predilections. Distinct from RID, rejecting the GID-model interpretation does not yield a rejection of the GGU-model.

Every physical law and every verified physical theory prediction is direct evidence for the GID-model. This form of direct evidence corresponds to how physical processes are detected. Being characterized as a relation, a physical process is revealed by the results that occur when the process is applied to specific physical objects. Each describable physical process relation corresponds to a behaviour-signature. Although the signatures are restrictions to the physical-world of higher-intelligence regulations, it is a remarkable fact that the universe controlling physical laws and verified physical theories are comprehensible at the human level of intelligence. For this reason, human beings can use them to construct a manmade material universe, a universe that can serve either good or evil intentions.

Is there a relationship between GID and RID? Suppose that, for a specified design, members of M or C model all relevant physical behaviour that could produce the design. Let the design description D* be RID attributed to a surmised intelligence. Hence, neither members of M nor C produce the design. This intelligence is not identified more specifically by the RID approach. However, it is identified explicitly as a GID higher-intelligence. This higher-intelligence is represented by an operator *C* that is composed of ***S** coupled with three other higher-intelligence processes, and it produces each RID identified design. Further, *C* represents the underlying intelligence that exists even in the case that standard operators produce the designs.

Importantly, the GID-model interpretation satisfies all of the canons for modern verified physical theories. The GID-model does not make judgments as to a design's purpose based upon human intelligence. It is shown elsewhere that there are specific steps that will falsify the GID-model.[46] Thus far no GID-falsifying real physical behaviour has been demonstrated to exist.

Theology

As a cosmogony, the GGU-model is capable of generating infinitely many different cosmologies. It can generate every proposed secular and theological cosmology. Of significance, the GGU-model can generate a cosmology that satisfies a strict Genesis 1 interpretation and the complete universe as observed today without contradicting young-earth evidence. RID cannot identify an intelligence that is not biological in character. But a non-biological higher-intelligence can be rationally described via GID and all of the cosmologies are generated and sustained by such a higher-intelligence. The GID-model rationally describes a higher-intelligence that satisfies the biblically described characteristics for God. The GID-model satisfies a general biblical purpose as implied by Romans 1:20. It verifies that our universe displays God's higher-intelligence. Of considerable significance is the fact that there is a vast amount of indirect scientific evidence for the existence of this specific higher-intelligence.

Glossary

Classical-styled logic-system: This is a general logic-system that uses the classical logic as first investigated by Aristotle. There are formal mathematically expressed rules of inference that yield all of these classical rules of inference. It is the everyday rules of inference used by humanity and almost all science-communities.

General logic-system: Formally this is a collection of mathematical relations, where the relations model rules of inference. To use this collection of relations, individuals most follow a fixed algorithm. This algorithm leads to the informal statements (A) – (E).

Microspheres: These biological objects form when solutions of proteinoids are cooled. Proteinoids are the thermal synthesis of polypeptides.

Mittelstaedt conditional: In quantum logic, this is a mathematically expression that models a type of deduction.

Popper falsification: Popper claims that the testability of a theory and falsification are different concepts. To falsify scientific theory, one supplies a statement using the theory language and if the statement were experimentally shown to be false, then it would invalidate the theory. For Popper, an attempt to experimentally verify such a statement may not be presently possible. Thus the statement need imply that an experimental verification can be made but certain additional conditions must be met. For example, a statement may require extreme temperatures for experimental verification. Hence, only when such temperatures are achieved would statement verification be possible.

Quantum logic: In quantum physics, certain microphysical processes may not be following the rules of classical logic. This is a mathematical theory that, among other aspects of quantum physics, uses the concepts of lattice theory and attempts to find a mathematical model that replicates these microphysical processes.

Stochastic process philosophy: This is a philosophy that states that all physical behaviour is probabilistic in character and only probabilistic models can replicate the behaviour. It claims that no physical behaviour can be explicitly modelled by a deterministic model.

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19. Dembski, ref. 3, p. 41.
20. Fitelson, B., Stephens, C. and Sobert, E., How Not to Detect Design. A review of William A. Dembski's *The Design Inference—Eliminating Chance Through Small Probabilities*, Cambridge University Press, Cambridge, *Philosophy of Science* **66**:485, 1999.
21. Fitelson, ref. 20, pp. 476–477.
22. Although the technical methods used can be challenged, they are not discussed in this article. (See Häggström, O., Intelligent design and the NFL theorem, *Biology and Philosophy* **22**:217–230, 2007; Olofsson, P., Intelligent design and mathematical statistics: A troubled alliance, *Biology and Philosophy*, 2008 (in press).) However, noted that, prior to adjusting the probabilistic estimate for the improbability notion, it is assumed that our universe is 10^{25} sec. old.
23. This describes, in brief form, the general foundational content of ref. 3.
24. Fitelson *et al*., ref. 20, p. 493.
25. The following has been attributed to Dembski: 'The entire set of relevant chance hypotheses has been first identified. This takes considerable background knowledge … Now it can happen that we may not know enough to determine all the relevant chance hypotheses. Alternatively, we might think we know the relevant chance hypotheses, but later discover that we missed a critical one. In one case a design influence could not even get going; in the other it would be mistaken.'
26. Herrmann, R.A., A Solution to the General Grand Unification Problem, <arxiv.org/abs/astro-ph/9903110>, 25 Aug. 2008.
27. Herrmann, ref. 6, pp. 61–76, 81–116.
28. In this section, the unmodified word 'intelligent' means the GID defined notion.
29. Indeed, if such mechanisms do exist, they need to be included in M or C either as now known or as new discoveries; consequently, RID would not apply.
30. Herrmann, ref. 6, pp. 65–69.
31. Herrmann, ref. 8, pp. 127–215.
32 Herrmann, R.A., Ultralogics and probability models, *International Journal of Mathematics and Mathematical Sciences* **27**:321–325, 2001; <arxiv.org/abs/quant-ph/0112037>, 25 Aug. 2008.
33. Herrmann, R.A., Hyperfinite and standard unifications for physical theories, *International Journal of Mathematics and Mathematical Sciences* **28**:93–102, 2001; <arxiv.org/abs/physics/0105012>, 25 Aug. 2008.
34. Herrmann, R.A., The best possible unification for any collection of physical theories, *International Journal of Mathematics and Mathematical Sciences* **17**:861–872, 2004; <arxiv.org/abs/physics/0306147>, 25 Aug. 2008.
35. Herrmann, R.A., The GGU-model and generation of developmental paradigms, <arxiv.org/abs/math/0605120>, 25 Aug. 2008.
36. Herrmann, R.A. Some GID evidence, <www.serve.com/herrmann/comparex.htm>, 25 Aug. 2008.
37. Herrmann, ref. 36, pp. 1–15.
38. Herrmann, ref. 33, pp. 94–95.
39. Herrmann, R.A., General logic-systems and finite consequence operators, *Logica Universalis* **1**:201–208, 2006; <arxiv.org/abs/math/0512559>, 25 Aug. 2008.
40. As is well known, this justification process is a particular aspect of mathematical proofs. It may not be as strongly applied for physical-science derivations.
41. All of the GGU-model operators have determinable mathematical characteristics that are equivalent to 'mental' processes. Hence, distinct from surmise intelligence, GID intelligence is specifically equivalent to a measurable form of intelligence.
42. Herrmann, ref. 35, p. 6.
43. Herrmann, ref. 35, p. 7.
44. Herrmann, R.A., The hyperfinite and the GID-model, <www.serve.com/herrmann/hyperfinite.htm>, 25 Aug. 2008. Also see Herrmann, ref. 33, pp. 8–12.
45. As an example of special control by a pure higher-intelligence, consider probabilistic behaviour modeled by P. If of 100 photons statistically only 4 are partially reflected from a piece of glass, then this is a basic alteration in the behaviour of the photon-glass physical-system. If a physical theory is used to predict that physical reflection occurs for a portion of the photons, then this is an intelligently designed change in the behaviour of the photon-glass physical-system. Consider the photon-glass physical-system as exhibiting no photon-reflection behaviour as altered to present a photon-glass physical-system that exhibits (statistically determined) photon reflection. Each of the 'solitary' events that appear to be a photon reflection is controlled by the pure ultralogic P, an operator that preserves the statistical predictions (see ref. 32). For the GID-model, operator P represents a higher-intelligence. Including with the behaviour-signatures an agent P that controls the individual occurrences of the intelligent designed probabilistic events, allows one to state that the construction of every physical-system from its constituents and every alteration in physical-system behaviour as required by any known physical law or verified physical theory is produced by higher-intelligence.
46. Herrmann, ref. 8, pp. 73–74.

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