Is the 'Theory of Universal Information' a weak theory?

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Scientific progress thrives on the exchange of arguments and positions. After Karl Popper, scientific theories must be falsifiable; i.e. they must be formulated in such a way that they may in principle be countermanded. A theory becomes better established as it remains standing despite all attempts to invalidate it. In his article in issue 26(3) of this journal, 'Information Theory—Part 2: Weaknesses in Current Conceptual Frameworks', Royal Truman criticized various aspects of our information concept—'Theory of Universal Information' (TUI)—that was comprehensively presented in the book *Without Excuse*[2]. His article could be seen as an attempt at falsification perhaps in order to improve TUI or to establish an alternative theory—of itself a worthy objective. However, we (W. Gitt, B. Compton and J. Fernandez) as authors of the book gained the clear impression that numerous critical details of the TUI were not understood; otherwise many of his objections would have been seen as superfluous or in error. This response is to address and remedy only a small, representative sample of objections that resulted from those misunderstandings. This should not be taken to mean that *all* of the errors that we encountered have been corrected.

For the sake of brevity we selected only 10 of the more serious points requiring correction. Here, I am only concerned with the objections regarding TUI and do not discuss Truman's information theory (this may be done at another time). I would, however, like to respond to RT's suggestion that his information theory—*Coded Information Systems* (CIS)—is a much more complete theory than TUI. Throughout the book, we stressed the need to first unambiguously define UI since UI is the entity that designs, creates, operates, and maintains functional *systems*. Additionally, we stressed the need for, and also described some of, the highly organized complex systems (what RT calls CIS) within the senders and receivers of UI that carry out the above-mentioned functions.

1. "Gitt believes information cannot be quantified, others believed it can, and in exact detail. Weber [note: he surely means Weaver—WG]), Claude Shannon's thesis supervisor, had this to say …" (p. 108).

Here RT confuses two things which are quite different in nature. When we talk of information, we invariably mean *Universal Information* (UI) unless we use the phrase *Shannon Information* or *Statistical Information*. When Shannon and Weaver talk about the amount of information, they mean only the statistical level of information in TUI—one of the five attributes but not a distinguishing attribute of UI. The statistical level can be quantified because it belongs to the material realm. But UI in its fullness is a non-material entity, and non-material entities (such as will, love, mercy and UI) are not quantifiable, certainly not by using the seven International Standard units of measurement.

2. "As another example of inconsistent, or at least questionable, usage of the word, we read that '... the information in living things resides on the DNA molecule.' The parts of the definition of information which satisfy apobetics (purpose, result) do *not* reside on DNA. External factors enhance and interplay with what is encrypted and indirectly implied on DNA, but apobetics is *not* physically present there" (p. 108).

Something fundamental regarding TUI is not being considered here. Apobetics can be contained in the code *explicitly*; however, in most cases it is contained *implicitly* (i.e. not verbally stated) and may be identified on closer inspection.

Example 1: When a programmer writes a program, the purpose of which is to find the roots (or zeroes) of a mathematical function, *f*—i.e. calculate *x* such that *f(x)=0*—then this intention is not physically present on the storage medium, it exists exclusively in the thoughts of the programmer. The sender (programmer) knows, on the basis of his mathematical and technical knowledge of programming, how he has to set up the code in order to arrive at the goal (calculation of the root). A mathematician can look at this program and, from the code, recognize the purpose (apobetic) of the program. The same applies also to DNA. The code letters in the DNA molecule are set out in the form of a program which corresponds to the goal-directed thoughts of the sender (apobetic).

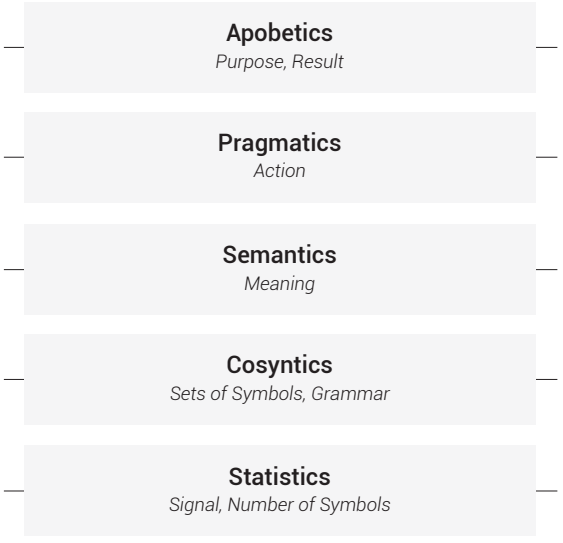

Figure 1. The five levels of Universal Information.

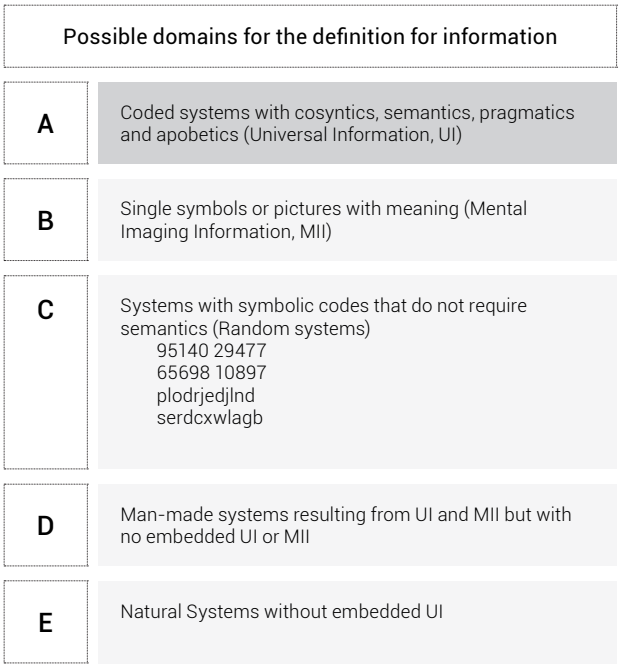

Figure 2. Five possible domains for the definition of information. Only domain A fulfills the conditions for a scientific law.

In both cases, the apobetics were not set out *explicitly*—but they are definitely present *implicitly*!

Example 2: Someone writes a letter to his mother and starts the letter with the words, "I'm writing to you today because you have a birthday and so I hope this letter brings you some happiness." In this case the apobetics of the UI (the letter) are *explicitly* expressed in the letter.

3. RT cites two of my statements, viz. 'Theorem 3' and 'Remark R2' and comments:
   "He (WG) appears to have switched to another (valid but different) usage of the word *information*. For example it is not apparent why valuable technologies like the first axe, shovel, or saw depended on the coded messages (statistics, syntax) portion of his definition of information, a definition which seems to require all five hierarchical levels to be present" (p. 108).

During the manufacture of all technical systems, UI is the *non-material* element in that manufacturing process, regardless of whether the UI is on paper, in a computer or solely in the mind and the brain. To shed light on this point, I will use the example of a bicycle shed which my neighbour and I built together.

The shed was constructed on a concrete slab, half on his and my properties, respectively. For this project, there were no technical drawings at any time, because my neighbour is a good civil engineer and had all the details in his head. These details consisted of thoughts composed of both Universal Information (UI) and visual Mental Image Information (vMII) (*Without Excuse*, pp. 77–79).

Additionally, the measurements and raw materials required for the shed were stored and retrieved as thoughts using UI, including cosyntics, semantics, and apobetics. The objective—namely how large and for what purpose the shed should be used (apobetics)—was worked through in joint discussions using UI (i.e. verbal language). Our actual construction of the shed would include the pragmatics.

This also similarly applies when it comes to the design, construction, and use of simpler technological devices such as the items cited by RT, the first axe, shovel or saw. The creation of these tools required thinking and this thinking undoubtedly included UI and MII (these are for the specifications, dimensions, and visualization of each tool performing its intended purpose (the pragmatics and apobetics)).

4. "An artist can wordlessly decide to create an abstract painting. Where are the statistics, syntax, and semantics portion of the definition of UI?" (p. 109).

Here it appears that RT has missed an important section of our book. In Figure 15, on p. 74 of *Without Excuse*, there is a clear distinction between UI, which is an abstractly coded system, and 'Mental Imaging Information' (MII), which is *not* an abstractly coded system. As discussed in the book, MII contains neither an abstract code nor abstract semantics. A painting—the example that RT uses—belongs to this latter category.

5. "Gitt offers a new definition for UI in his book *Without Excuse*: 'Universal Information (UI) is a symbolically encoded, abstractly represented message conveying the expected action(s) and the intended purpose(s) ... .' I don't believe [this] Definition 2 is adequate yet" (p. 109).

I had previously stated that pragmatics and apobetics do not necessarily have to be stated explicitly but rather these are frequently contained implicitly. A well-written computer program that finds the roots of a function need not explicitly state what its purpose is. However, when this program is properly executed on a computer it will carry out the pragmatics, thus achieving its intended purpose (apobetics). On p. 59 of *Without Excuse*, we describe the overarching significance of the apobetic (teleological) attribute of UI.

6. "Therefore, Gitt's elevation of his theorems to laws will seem weak compared to the powerful empirical and mathematically testable laws of physics" (p. 109).

In *Without Excuse* we clearly distinguish between physical scientific laws applied to material entities and scientific laws applied to non-material entities. The scientific laws for non-material entities are in their conclusiveness in no way inferior to those for material ones. The following three references from our book make this point abundantly clear:

- 4.3 The Nature of Physical Laws (pp. 102–109)
- 4.7 Scientific Laws for Nonmaterial Entities (pp. 113–114)
- A3.3 Must Scientific Laws Always be Expressed Mathematically? (pp. 314–318)

Unfortunately RT seems to also have missed this important point, which was summarized in *Without Excuse*, Chapter 5.3, p. 120, under point 2:

> "Because of UI's precise definition it was possible to discover and formulate Scientific Laws that are equal in standing to the Laws of Nature for material entities. This means that they have the same nature as the Natural Laws, i.e., N1–N10, Section 4.2. This demonstrates that it is possible to formulate Scientific Laws for a nonmaterial entity—in this case, *Universal Information*."

7. "For SLI-2 it is unclear what *entity* means ..." (p. 110).

SLI-1 states: *"Universal Information is a nonmaterial fundamental entity."* (*Without Excuse,* p. 124)

SLI-2 states: *"A purely material entity cannot create a nonmaterial entity."* (*Without Excuse,* p. 125)

'Entity' is a fairly common word generally defined as: something that exists in and of itself; a thing. Examples: a corporeal entity; political entities (plural); moral entities; material entities such as mass and energy. 'Entity' is also used synonymously with the word 'being'; e.g. *Society is composed of sentient entities (beings).*

For the purpose of comprehending the use of the word 'entity' in SLI-1, SLI-2 and in all of *Without Excuse*, the first definition above is all that is necessary.

As examples, in the fifth chapter of *Without Excuse* we repeatedly use the word 'entity' (or 'entities'), each time in accordance with the definition provided above:

- 5.2 The Difference Between Material and Nonmaterial Entities (pp. 119–120)
- 5.3 Universal Information as a Nonmaterial Entity (pp. 120–121)
- 5.4 The Scientific Proof that UI is a Nonmaterial Entity (pp. 121–124).

8. "What about SLI-2 through SLI-4? I see no chance they would be falsified ... " (p. 110).

Not true—all three laws are falsifiable:

SLI-2 would be falsified if UI could be measured with Standard International (SI) units, since SI units encompass all material entities (this is comprehensively described in chapter 5.4, pp. 121–125).

SLI-3 would be falsified, if someone could show a process in which UI emerged solely in and through unguided matter.

SLI-4 would be falsified if someone could show UI originating without intelligence.

9. "SLI-3 surely can't be falsified, since the definition requires the presence of apobetics, which seems incompatible with statistical processes. There seems to be a tautology here, since statistical processes describe outcomes with unknown precise causes, whereas apobetics is a deliberate intention" (p. 110).

This point of criticism does not take into account that the sender and receiver of UI do *not* belong to the definition of UI. This aspect of UI was expressed via figure 9, p. 39. The definitions 1 and 2 do not speak of a sender either. This also eliminates any discussion of the presence of a tautology. The scientifically required conditions for falsifiability are fulfilled. SLI-3 would be falsified if, for example, one found either an intended goal or purpose (apobetics) or a functional result (pragmatics) in a stochastically generated sequence of letters. Finally, although the statistical level is an attribute of UI, it is not a *distinguishing* attribute and therefore not incorporated into definition 2.

10. Whether or not an unknown message constitutes Universal Information in the sense of definition 2 may be established on the basis of the four distinguishing attributes of UI: cosyntics, semantics, pragmatics, and apobetics.

Example: "What's the time?"

Cosyntics: One recognizes that symbols (a defined character set) have been taken and put together as words. Corresponding to the rules of grammar, these words have been used to construct a syntactically correct sentence.

Semantics: The sentence contains a meaning.

Pragmatics: The question anticipates (expects) a reply. Supplying a reply is an action (performance) on the part of the receiver.

Apobetics: One possible scenario here is that the sender has asked this question because he has an urgent appointment and does not have a timepiece. His goal is to learn the time so as to not be late.

Similarly, these attributes are present in RT's second example (vehicle prices).).

10. RT gives two examples of coded information; one is a question about the time of day (e.g. "What's the time?" (p. 110).), and in the other, the prices of various vehicles are compared and communicated in a message.

Summary

I am confident that these comments to the ten sampled objections illustrate that RT either missed or misunderstood a number of critical details of the TUI that were discussed in our book *Without Excuse*. Despite this, I am appreciative of his efforts to study and critique our TUI. By so doing, RT has provided an invaluable service by helping to establish the TUI as a solid theory on information. We encourage others to examine the TUI, as presented in *Without Excuse*, and to voice any comments on the strengths and weaknesses that they perceive.

References

1. Truman, R., Information Theory—Part 2: weaknesses in current conceptual frameworks, *J. Creation* **26**(3):107–114, 2012.
2. Gitt, W., Compton, B. and Fernandez, J., *Without Excuse*, Creation Book Publishers, Powder Springs, GA, 2011.