

What is knowledge?

What is knowledge? Knowledge can be defined as a type of information construct that has evolved from a reflective discourse with the environment such that it enables the extension of that construct's temporal existence through its functions and actions. Consequently, knowledge is not limited by mental activity - It is not the preserve of human thinking, neural mechanisms, intelligence, or understanding.

In contrast, this is what the Stanford Encyclopedia of Philosophy, says about knowledge:

It is common in epistemology to distinguish among three kinds of knowledge. There's the kind of knowledge you have when it is truly said of you that you know how to do something—say, ride a bicycle. There's the kind of knowledge you have when it is truly said of you that you know a person—say, your best friend. And there's the kind of knowledge you have when it is truly said of you that you know that some fact is true—say, that the Red Sox won the 2004 World Series. Fantl, Jeremy, "Knowledge How", *The Stanford Encyclopedia of Philosophy* (Winter 2012 Edition), Edward N. Zalta (ed.), <http://plato.stanford.edu/archives/win2012/entries/knowledge-how/>

Clearly, to distinguish in this manner, among three kinds of knowledge is to limit the scope of its meaning - There is little in this introductory excerpt to suggest that knowledge is anything but the preserve of humans. In my opinion, to understand knowledge, demands an understanding regarding the emergence and evolution of different types of information constructs; from bottom to top.

This difference in the interpretation of knowledge was made apparent in an exchange between Massimo Pigliucci and me. (<http://rationallyspeaking.blogspot.co.uk/2013/09/three-and-half-thought-experiments-in.html>). (PDF <http://web.gc.cuny.edu/philosophy/faculty/pigliucci.htm> <http://www.platofootnote.org/> At last count, Massimo has published 113 technical papers in science and philosophy. He is also the author or editor of 10 technical and public outreach books. Chair of the Philosophy Department at Lehman College and Professor of Philosophy at the Graduate Center of the City University of New York). During this exchange I endeavoured to persuade Massimo to change his view; a view that explicitly states that knowledge requires a nervous system. Whilst I did not succeed in this challenge, I did manage to indicate striking inconsistencies in Massimo's arguments.

What I intend to do now, is give an account of these inconsistencies and explore their significance. This is intended to indicate the weakness of current interpretations as to what is knowledge. To illustrate my point further, I will then articulate the "Edna the alien" thought experiment. The point of the thought experiment is to show that organisms like plants must possess a bio-chemically encoded knowledge; and therefore that knowledge is not the preserve of humans or of neural mechanisms.

Overview

What follows is a summation of the dialogue between Massimo Pigliucci and me:

1. The text in italics are my summarised statements expressing Massimo's views. These italicised statements are derived from Massimo's answers to my questions; which are provided in the bracketed text that follow each statement. (You can read the full text of Massimo Pigliucci's exchange with me here <http://rationallyspeaking.blogspot.co.uk/2013/09/three-and-half-thought-experiments-in.html>).
2. Following the summation, I will provide some concluding remarks and questions.

3. Then I describe the thought experiment entitled “Edna the Alien”, which illustrates that behavioral responses that are accurate in their reflection of environmental conditions/properties, and therefore which are beneficial to survival, must entail a knowledge that is based on a bio-chemical/ bio-physical construction.
4. Finally there is some analysis of thought experiment.

Summary

A. Massimo Pigliucci on knowledge:

Pigliucci: **Knowledge does not require understanding* - (Pharoah: Are you of the view that there can be intelligence in the absence of knowledge?)

Pigliucci: No, because knowledge doesn't require understanding.)

Pigliucci: **Knowledge requires understanding* (Pharoah: Since you are of the view that there cannot be intelligence in the absence of knowledge, am I right in understanding that this mean that you are of the view that in the absence of understanding, plants nevertheless possess knowledge by virtue of their display of intelligence?)

Pigliucci: I am not. I am of the view that there cannot be knowledge without understanding.)

Pigliucci: ***Intelligence requires knowledge* (Pharoah: Are you of the view that there can be intelligence in the absence of knowledge?)

Pigliucci: Good question: No, because knowledge doesn't require understanding. A bacterium “knows” to move away from dangerous chemicals, thus showing an intelligent behavior. But there is no understanding of the dangerous nature of the chemical, nor conscious awareness of the evasive maneuver.)

Pigliucci: ***Intelligence does not require knowledge* (Pharoah: >Since you are of the view that there cannot be intelligence in the absence of knowledge<...)

Pigliucci: I am not.

Pigliucci: I am of the view that there cannot be knowledge without understanding. Again, lions are intelligent. Plants **behave** intelligently. (The difference being caused by the former, but not the latter, having a nervous system.)

Additionally

B. Massimo Pigliucci on intelligence:

Pigliucci: *There is a difference between intelligence and behaving intelligently* (Pigliucci: lions are intelligent. Plants **behave** intelligently. (The difference being caused by the former, but not the latter, having a nervous system.)

1. Of intelligence:

Pigliucci: *Intelligence requires a nervous system* (Pigliucci: lions are intelligent. Plants **behave** intelligently. (The difference being caused by the former, but not the latter, having a nervous system.)

2. Of intelligent behaviour:

Pigliucci: *Intelligent behaviour does not require understanding* (Pigliucci: A lion (or a plant, for that matter) can act very intelligently and yet have no understanding of what it is doing)

Pigliucci: *Intelligent behaviour is programmed by natural selection* (Pigliucci: All organisms behave “intelligently” in the sense of having non random responses to their environment... that sort of adaptive behavior was “programmed” (yes, it's a metaphor) by natural selection.)

Pigliucci: *DNA holds and implements the programme* (Pharoah: The plant acts intelligently, but only because natural selection has programmed it... programmed it with what? And what holds the programme in the plant? What name do we call this vehicle that holds and implements “the programme”?)

Pharoah: > what holds the programme in the plant? <

Pigliucci: DNA?)

Pigliucci: *Computers can behave intelligently* (Massimo: It also doesn't mean that computers cannot behave intelligently. They clearly can and do (think of IBM's Deep Blue and Watson).

Concluding remarks

A:

If Massimo Pigliucci is unclear if knowledge does or does not require understanding (*) and he it is unclear if intelligence does or does not require knowledge (); then he is no longer clear if knowledge does or does not require a nervous system.**

B:

Since, Massimo Pigliucci has said that,

i) knowledge requires understanding; and that

ii) knowledge does not require understanding,

there may be two types of knowledge to which he refers - in a similar fashion to there being a distinction, in his view, between intelligence and intelligent behaviour i.e. Perhaps there is ‘being knowledgable’ and ‘behaving knowledgable’. In other words, perhaps there is a type of knowledge that requires nervous mechanisms and a second type that need not.

C:

Since intelligence and intelligent behaviour differ,

then, there are either two different definitions or types of intelligence; or

one intelligent behaviour does not genuinely relate to intelligence - In other words, intelligent behaviour is fake intelligence or merely appearance without substance.

D:

Since Massimo Pigliucci has expressed the view that computers, plants, and bacterium have no understanding, knowledge, nor intelligence, but behave intelligently, is each of their intelligent behaviours of equivalence or are there different types or classes of intelligent behaviour (bearing in mind C above)? Similarly, (in view of C above) are there different types or classes of behaving knowledgable?

E:

Massimo Pigliucci expresses the view that agents can behave intelligently without intelligence, knowledge, or understanding; That intelligent behaviour, in his view, is programmed - In the example of plants intelligent behaviour is programmed by nature via DNA, and in the example of computers, intelligent behaviour is programmed by the human. However, plants are a naturally emergent feature of nature itself - They are nature.

In my view, the particular understanding that humans possess over other animals is derived from a conceptually based knowledge capability (which is why feelings, being non-conceptual in derivation, are ineffable and inaccessible to that conceptual based knowledge) - It is this conceptual knowledge that enables us to say of humans that they are capable

of 'being knowledgeable'. Clearly, one would have to clarify what constitutes conceptual knowledge to make full sense of this distinction.

Additionally, my view is that the conceptual based knowledge that humans exclusively possess is an emergent feature of a hierarchical growth in different classes of information constructs.

From this, I argue that a bio-chemical/ bio-physical construction that leads to an 'accurate response' to environmental conditions/properties - accurate in that consequential behaviours and functions are beneficial to survival - entails a knowledge about the environment.

Edna the alien thought experiment

One hundred years from now humans have found, on a planet in another solar system, the dead fragments of a once living organism - They nickname her, "Edna O'Neil". The planet has suffered a catastrophic disaster and there are no living lifeforms. On examination, it is found that Edna's chromosomes are constructed not from DNA, but an alternative compound. This "Alternative-DNA" (A-DNA) is taken back to earth.

With some clever computer technology, geneticists use the A-DNA from Edna to reconstruct a graphic representation of what Edna would have looked like. They also are able to determine many of the bio-chemical sequences of this unique organism:

Essentially, the scientists are able to ascertain that Edna was a plant-like organism. From Edna's structure, colour, size, bio-chemical mechanisms and other characteristics, the human scientists are able to work out details about the conditions pertaining to Edna's environment. For example,

- i) The light from the planet's sun was weak in comparison to that of earth's.
- ii) The geneticists calculate from the plant's structure that the planet's gravity is likely to have been half that of earth's.
- iii) They can ascertain that the environment was evidently arid and very windy.
- iv) Edna's bio-chemistry indicates how she created energy for respiration, how she reproduced - the understanding they acquire about Edna and crucially, her planetary and solar environment is extensive!

The proposal, is that the "Edna the Alien" thought experiment demonstrates, that the conceptual knowledge that the human geneticists acquire, which is gathered

- i) First from information pertaining to the A-DNA sequences; and
- ii) Secondly, from the computerised reconstruction of Edna's bio-chemical and physiological compositions,

draws us to conclusion that the bio-chemical and physiological particulars of any creature, are a type of knowledge construct about the environment - It is the particular construction of Edna's A-DNA, which enables the capable human geneticist to derive conceptual based knowledge about Edna's and only Edna's particular environmental parameters.

Therefore, bio-chemical and physiological features are a type of knowledge construct.

With lifeforms from earth, this construct is encoded by individual units of DNA data, which include the information by which DNA sequences that data to create the knowledgeable construct. The degree of accuracy of the knowledge as it relates to the environment is instrumental in determining the survival potential of the creatures replicating construct: If

the knowledge about the environment is accurate, the creature's activities enhance survival potential. If the knowledge is inaccurate, the creature tends to expire before it can replicate.

Can this thought experiment be extended in our evaluation of other types of information constructs that are not capable of replication? - Can one make conclusions about the constructs such as, for example, atoms?

I believe that one can.

If scientists acquire conceptual knowledge regarding the nature of the construct of, for example, an atom, they can use that information to derive conceptual knowledge about the formation of atoms in general, or the relationship between atoms, and so on. That one can derive conceptual knowledge from any physical construct, is to say that all true physical constructs contain information - In other words, physical constructs are information constructs. The deciphering of the various types of information constructs enables humans to develop conceptually derived knowledge about the nature of the information presented in the interactions of the physical world.

In the absence of this information; for example in the case of the kind of information concerning the construction of consciousness, humans possess no conceptual based knowledge - The experience is one that evades analysis. But this lack of conceptual knowledge ceases if one determines the underlying unified principles concerning all types of information constructs. When this conceptual knowledge about information constructs is realised, the interactive experience of the consciousness phenomenon is no longer a mystery.