

System explained by Humberto Maturana

Information: The false turn by attempting to quantify meaning; Belongs to engineering not biology; Dynamics of structural change

Speaker 1, Humberto Maturana:

SPEAKER 1: Humberto, I just want to develop further this understanding of conversation and the generative power it has. How it helps to create our reality.

In a way-- what if I may just comment on that point, we may say that language implies to make distinctions about coordination of actions. We make that-- and as we do that, we create new possibilities, new options, and we relate them to others through our emotions. In that process, we create some form of reality for ourselves. Is that a reasonable reflection of—

HUMBERTO MATURANA: Yes, yes, it is. Because if we operate in objectivity in parenthesis, that mean if we operate always aware that we cannot pretend access to an independent reality, we'll operate always open to reflection.

But as we do that, we realize also that the world that we are living is not something that pre-exists us but is something that is arising with our living. And our living as human beings is in conversations. So, the networks of conversation that we leave bring forth the domains of realities that we live. Bring forth worlds that we live.

If the network of conversation changes-- if your reflection will change, our emotioning, and hence the doings that we do together and the conversations, then we change reality. So, what happens to us is that we can become aware that we are generating the world we live by the conversations that we do all the time.

On the science, for example, what it does is not explain an independent reality, but explains experiences within domains of experiential coherence. And in that way, it's a continuous opening for the generation of new conversations and new domains of reality.

SPEAKER 1: So, developing knowledge, creating an understanding of the world we operate in is essentially a conversational process—

HUMBERTO MATURANA: It's an essentially conversation process—

SPEAKER 1: --which we are comparing with other experiences we have had?

HUMBERTO MATURANA: Yes. And it's a genetic process open for a continuous change of the world we live in. Because the world we live in is generated in our conversations.

SPEAKER 2: Humberto, your research and experience provides many challenges, not least to notions of objectivity and reality. I think also it provides a challenge to how we think of information, particularly as it is used in common metaphors about information transfer and the information revolution. Could you expand on that?

HUMBERTO MATURANA: Yes. Many years ago-- not many years ago-- but about 12 years ago, I had the opportunity to look into the work of a very distinguished Chilean physiologist and some fresh little work in his honour. And I read practically 70% of his work since 1939 to 1983, or something like that. And there, I observed that, around 1952, he began to use the word information. Prior to 1952, nerve impulses, nerve fibres conducted nerve impulses. After 1952, nerve fibres conducted information.

This is a very remarkable happening. Because everything goes the same. But instead of nerve impulse, information appears. And about the same-- and this is related to this book of Shannon about the theory of communications and the notion of information there. What happened, I think, was that physiologists, biologists, sociologists, psychologists thought that the theory of information provided the means to quantify meaning. Meaning was what was significant.

If one wants to speak about the nervous system, a real problem would be traditionally meaning. How does the meaning of the external world get handled by the nervous system? How do we transmit meaning? And so, I think that this was the confusion. People would not easily acknowledge this. But if you read the literature, you discover that information was being treated as meaning.

Now for the design of engineering system, for the design of telephonic communications, and so on, for the design of systems, it works perfectly in the engineering domain. Because it has to do with the structure of the elements of interaction. But in the biological domain, it does not work so. And it does not work so because—

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--the situation for information transmission is of the following kind.

Suppose you have here a receptor emitter, a channel, and, at the other end, another receptor emitter. And you want to send a message. So, what you do is to take a list of alternatives. One, two, three, four, five. And associate one of these alternatives with a signal. And let the signal be transmitted along this channel with whatever means, that you wish to avoid deterioration, whatever it is. So, the receiver, what it has to do, is to associate this signal with the particular element of a list which is the same as the list in the original emission.

Now if you have this, you associate this with four, one, two, three, four, five, one, two, three, four, five. If you make this association, you say information has transmitted. Uncertainty has been reduced. Whatever it is. Fine, this works fine.

But what happens if these lists are not equivalent? Well, people would think you have to reduce variety. But if they are not identical, then you have no way of making the association between an element of the emitter list with the receiver list in a way which, by itself, does what one expects to happen when the lists are the same.

Now, if I make an artificial situation, for example, in a telephone conversation, if I speak to China in English and the Chinese speaks to me in Chinese, then it is the same as having two completely different lists. But if the Chinese answers me in English, then there is no problem. Because the lists are the same or are essentially the same.

OK. This can be-- in this communication situation, you can create this, no problem. But if you deal with living systems, if you deal with the relation between the nervous system of the eye and the medium, the situation is completely different. These lists are completely different. They have no sense to speak about capturing information or transmission of information in the central nervous system. Because this condition does not apply. But there is something that happens during the conversation.

If the conversation goes on, look how interesting it is. Two persons begin to participate in the conversation. And if you hear them, they are completely disparate. They do not coincide. And as they go on, everything is changing. And eventually, they are in agreement or they are in coherence. And when that happens, the conversation stops. And when in that situation, when the lists have become the same, there you could apply the notion of transmission of information.

But the nervous system does not operate in those terms. It operates in the structural dynamics. In an entirely different way. The notion of information does not have a realistic value to understand the operation of the nervous system or the operation of perception.

SPEAKER 1: So, what is it that really the nervous system is doing, in that case?

HUMBERTO MATURANA: What is happening there is the dynamic of structural changes. What happens is that the structure of the participants change congruently. And so, the domain of doing things together becomes expanded or become stabilized, because the structure have changed congruently.

SPEAKER 1: So, the notion of informality. That makes sense?

HUMBERTO MATURANA: Informality in the sense that it participates in the acquisition of the form of the other, yes. It would make sense. But it does not make sense if one were to think that this specifies reform of the other. It's a coherent transformation from mutual triggering. Not through specifying restructure of the other.