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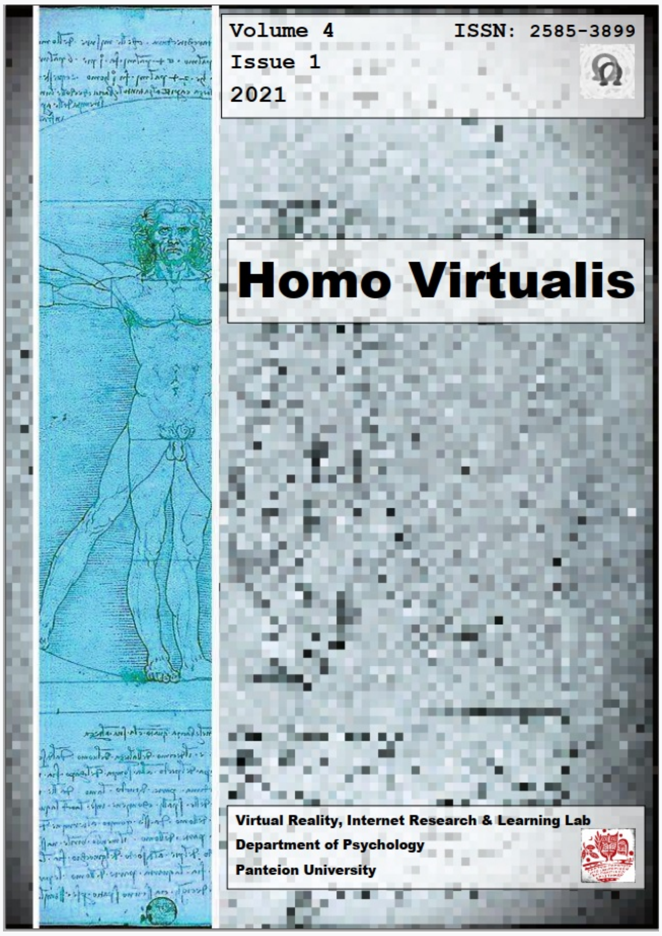

Ad hoc solutions to wicked problems: Pandemics and other challenges in context

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Commentaries

Ad hoc solutions to wicked problems: Pandemics and other challenges in context

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Wicked problems are considered to be any social, cultural, or other challenges that are difficult to address and hard to devise an effective and sustainable solution for. The utopic wishful thinking humanity relied on for so many decades, that technology and science alone, like a new *Deus ex machina*, would ultimately save us from any problematic situation we would ever face, and from any possible catastrophe we would ever confront, proved to be unrealistic. Catastrophe is a compound Greek word, literally meaning “approaching a turn”. If you are heading at full speed toward a turn, you either have to slow down and turn toward the road again to save life, or you are going to crash. Unless, of course, you prefer to rest upon an external magical aid, a *Deus ex machina*, to rescue you at the edge of the cliff. A Catastrophe can be realized as a *bifurcation point* in terms of complexity theory, a point of chaos and unpredictability, or a tipping point (Capra & Luisi, 2014). Behind fueling wicked problems and deadlocks lies a Newtonian conception of reality, where the universe is realized as a mechanical automaton, a timeless space where an infinite knowledgeable entity can predict and leverage everything (Mitchell, 2009).

> The problems that scientists and engineers have usually focused upon are mostly "tame" or "benign" ones. As an example, consider a problem of mathematics, such as solving an equation; or the task of an organic chemist in analyzing the structure of some unknown compound; or that

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> of the chess player attempting to accomplish checkmate in five moves. For each the mission is clear. It is clear, in turn, whether or not the problems have been solved. Wicked problems, in contrast, have neither of these clarifying traits (Rittel & Webber, 1973, p. 160).

Unfortunately, the Newtonian view, and the corresponding positivist epistemology, have been proved to be a simplistic conception of the universe. Chaos theory, the work of Ilya Prigogine in *far from the equilibrium systems*, and the work of many other scholars in the 19th and 20th centuries, allowed us for a different view of the world, a conception of life as an ever entropic, unpredictable, and, at the same time, creative process. This is about a new view of the physical world that allows for wicked problems to be acknowledged, as well as for creative solutions to emerge. However, it seems that governments, policymakers, and other institutions keep looking for simplistic solutions in a complex, non-linear, and totally unpredictable world.

Figure 1. Commercial DDT products for use as home insecticides back in the 1960s.

Characteristics of Wicked Problems

A wicked problem is a social, community, or other policy problem that is extremely difficult or impossible to solve. The term 'wicked' in this context is used to denote resistance to resolution rather than something evil. An Australian Public Service Commission Report (2018) highlights the following characteristics that wicked problems share:

- Wicked problems are difficult to clearly define.

- Wicked problems have many interdependencies and are often multi-causal.
- Attempts to address wicked problems often lead to unforeseen consequences.
- Wicked problems are often not stable.
- Wicked problems usually have no clear solution.
- Wicked problems are socially complex.
- Wicked problems hardly ever sit conveniently within the responsibility of any one organization.
- Wicked problems involve changing behavior.
- Some wicked problems are characterized by chronic policy failure.

Figure 2. DDT, an effective insecticidal, soon infiltrated the food chain with serious unintended consequences. Photo "Barn swallow (feeding) at Tennōji Park in Osaka, June 2016" by Laitche, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=49545385

When ad hoc solutions do not seem to work for wicked problems

Today we are faced with an unprecedented set of challenges, wicked problems, that cannot be addressed by any of us individually. Climate change resulting in physical catastrophes, the overexploitation of environmental resources, and the degradation of the quality of life on planet earth for all the living forms, are among some of them. And now the pandemic. And the next pandemics to follow, sooner or later. What once was thought to be exceptional, now is becoming the new normal. Living in the age of uncertainty with more crises coming after crises, a new liquid reality appears as the new normal (Bauman, 2007). All these challenges create a dystopic landscape that seems to defy individual, uncontextualized action. It is a call for complex concerted action from many individual actors that need to be as effective and efficient as possible (Brailas et al., 2017).

> That all ad hoc measures leave uncorrected the deeper causes of the trouble and, worse, usually permit those causes to grow stronger and become compounded. In medicine, to relieve the symptoms without curing the disease is wise and sufficient if and only if either the disease is surely terminal or will cure itself. (Bateson, 1972, pp. 496–497)

Gregory Bateson, back in 1972, demonstrated through the case of DDT how linear thinking does not work in a complex world. DDT is a chemical compound that in 1939 was discovered to hold insecticidal qualities. Paul Hermann Müller received the 1948 Nobel prize in Physiology or Medicine for this discovery. According to Bateson, "the history of DDT illustrates the fundamental fallacy of ad hoc measures." (Bateson, 1972, p. 497) As an insecticidal, DDT proved to be a quite effective solution for fighting insects, and by doing so, increasing agricultural production, and fighting malaria worldwide. In Bateson's words, "DDT was a symptomatic cure for troubles connected with the increase of population." (Bateson, 1972, p. 497) However, DDT quite soon infiltrated the food web causing a cascade of unintended results.

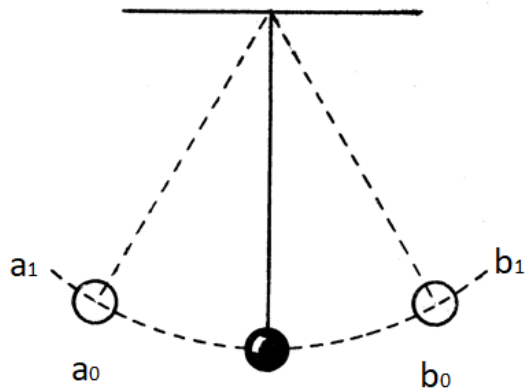

Figure 3. An example of a simple system, governed by linear causality, is the classical pendulum. An initial condition a_0 causes an effect b_0, while a slight difference in the initial condition a_1, will cause just a proportional different outcome b_1

DDT proved to be seriously toxic for living animals while the insects which were targeted started to become immune. Birds and other animals fed on those insects and soon DDT infiltrated the food web driving a cascade of environmental consequences. However, the financial investments in manufacturing DDT did not allow for its immediate withdrawal. It took until the 1970s, after many decades, for world governmental institutions to prohibit its use. In other words, for some time the world became addicted to an ad hoc measure, despite having proved that it caused more damages than benefits (Bateson, 1972).

How to navigate in murky waters

In complex social systems, linear causality (Figure 3) does not apply. In contrast to linear causality, we face a case of complex causality, if an initial condition a_0 causes an effect b_0, and a slight difference in the initial condition a_1, causes a different effect b_1, while another even slightest difference in the initial condition a_2 causes a totally disproportional condition to b_1 effect b_2. Such a system is regarded as *sensitive dependent on the initial conditions*. In this case, prediction becomes impossible. The double pendulum is an example of such a system. Many scholars use the condition of *sensitive dependence on the initial conditions* to define complexity and complex processes (Feldman, 2012).

> In parts of the natural world such small uncertainties will not matter. If your initial measurements are fairly but not perfectly precise, your predictions will likewise be close to right if not exactly on target. … But sensitive dependence on initial conditions says that in chaotic systems, even the tiniest errors in your initial measurements will eventually produce huge errors in your prediction of the future motion of an object. In such systems (and hurricanes may well be an example) any error, no matter how small, will make long-term predictions vastly inaccurate. (Mitchell, 2009, p. 20)

In the complex techno-social reality we live in, symptomatic solutions are not enough to address wicked problems. We keep looking for simplistic solutions in an inherent complex world. Something different is needed. Newtonian science and technology can provide working and sustainable solutions, only if they are combined with a systems thinking approach providing a holistic view in context.

When we are in an urgent need to take ad hoc measures, for example, to address a direct lethal threat like a new virus, it is critical to take advantage of the time gained through the treatment of the symptoms to devise more sustainable solutions.

Otherwise, things can get even worst in the long run. Regarding the COVID-19 pandemic, Yuval Noah Harari (2020) points out:

> We must act quickly and decisively. We should also take into account the long-term consequences of our actions. When choosing between alternatives, we should ask ourselves not only how to overcome the immediate threat, but also what kind of world we will inhabit once the storm passes. Yes, the storm will pass, humankind will survive, most of us will still be alive — but we will inhabit a different world.

Toward a systems view of life

The classic Buddhist parable of the *blind men and an elephant* illustrates the need for collaboration and collective action to address a complex problem for which nobody alone holds the answer. It is a story of a group of blind men that come across an elephant for the very first time. Each man tries to realize what he is touching from his own limited perspective (the tail, the tusk, one leg, etc.) without having prior knowledge of the whole. The story's moral is that only by combining their limited, subjective experiences the men would be able to come closer to an understanding of what an elephant is. Only if the blind men, acting as peer members in a community of inquiry, would get into dialogue, interchange points of view, compare different perspectives, argue, and test the working hypothesis, would it be possible to eventually realize what an elephant is (Shields, 2003).

A final verse of this famous story goes as:

> And so these men of Indostan
> Disputed loud and long,
> Each in his own opinion
> Exceeding stiff and strong,
> Though each was partly in the right,
> And all were in the wrong!

What we can learn from a systems view of life is that, under specific conditions, though everyone could be partly in the wrong, altogether could be in the right, as far as "it is the difference that makes the difference" in the words of Gregory Bateson (Brailas, 2020). Allowing through a group process for collective peer wisdom to emerge as the pattern that connects the otherwise isolated narratives (Brailas et al., 2017). The main advantage of a collective peer group process "is not just the informational and cognitive surplus that will enrich the stories and the personal narratives. It is through the peer-to-peer interactions that participants establish meaningful relationships among them, and it is through this process that they practice how to relate and connect with other human beings, and how to create personal humanizing networks." (Brailas, 2021, p. 14).

According to Capra and Luisi (2014), emergent properties are the novel properties that arise when putting together components of lower complexity in a context that allows for dense meaningful interactions between them. "The properties are novel in the sense that they are not present in the parts: they emerge from the specific relationships and interactions among the parts in the organized ensemble." (Capra & Luisi, 2014, pp. 154–155) Complex systems are unpredictable in the micro-level, but predictable in the macro level: although someone cannot predict and control the evolution of a living system in the long run, it is still possible to identify its 'strange attractor' a macro-structure that determines its overall macro behavior. This is why *deterministic chaos* seems to be a more appropriate term to describe living processes (Byrne, 1998). The previous century's dominant scientific paradigm was grounded on a Newtonian view of the universe as a totally predictable mechanical automaton (Mitchell, 2009). Today, Chaos and Complexity Theories offer us a different epistemological view; a view that is closer to the reality practitioners working with living systems constantly encounter. Although we live in an entropic, far from the equilibrium, and irreversible universe, paradoxically life seems to always invent a way to self organize (Prigogine & Stengers, 1997).

Dreaming of an Eutopia

As a systems-thinking practitioner, I would argue that life is not about predicting; life is about dreaming and creating the future you want to live in. But the (still) dominant epistemological paradigm in research, even in social and human sciences, focuses on prediction: how to control the future by making as accurate predictions as possible, maybe a relic of a still dominant Newtonian epistemology. Nevertheless, even if (long term) predictability was ever possible, wouldn't that render life boring, or even doomed? Unpredictability intimidates us while, at the same moment, allows us freedom and creativity. Yes, life is unpredictable, so let's celebrate it! In the here and now, is the only certainty we occupy. Prediction is impossible, but every question we ask creates a bridge to the future we dream to create, not as an definite prediction but as a liberating force, as an expectation we share, by living and flourishing in the present moment while we are dreaming of the future we are looking for (McAdam & Lang, 2003, 2009). And the challenge still remains: How to build such a bridge in a complex world with no linear causality at work? How to catalyze self-organization and emergence both in the micro and macro, whole-system, level of our lives? Fortunately, unpredictability is always entangled with an array of available opportunities: roads and bridges to create and traverse. It is up to us to realize the opportunity; an opportunity that does not preexist, but one we have to create. According to Heinz von Foerster it is a matter of whether "one first considers oneself to be an independent observer who watches the world go by; as opposed to a person who considers oneself to be a participant actor in the drama of mutual interaction" (von Foerster & von Foerster, 2003, p. 289). We are active actors in the drama we co-create. Working creatively with human systems is like making a patchwork that is "a laborious and constantly evolving process. It can be stressful, tiring, and frustrating too. You are likely to get stuck. You do not know what the end result will be. We have to engage our imagination and enjoy the process of creating moment by moment." (Santin et al., 2019, p. 98)

> In the center of Fedora, that gray stone metropolis stands a metal building with a crystal globe in every room. Looking into each globe, you see a blue city, the model of a different Fedora. These are the forms the city could have taken if, for one' reason or another, it had not become what we see today. (Calvino, 1974, p. 32)

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Notes on Contributor

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