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COVID 19 in the US through the lens of Transition Design

Terry Irwin [(1)], Gideon Kossoff [(2)] and Tim Gasperak [(3)]

Abstract: This project was undertaken by a small team of researchers affiliated with the Transition Design Institute at Carnegie Mellon University, Pittsburgh, U.S.A. It is "work in progress" shared with a specific group as an introduction to the Transition Design approach and its emerging toolkit for addressing complex, "wicked problems", *and should not be considered concl usive research*.
In March, 2020, as COVID-19 was emerging in the U.S., we decided to use the Transition Design approach to track and analyze the spread *of* and response *to* the pandemic in the U.S. This scope of research is in tended to serve as a "sketch" to guide further qualitative research involving a variety of methods such as: stakeholder[1] and expert interviews *(with experts such as epidemiologists, sociologists, historians, policy makers, politicians, healthcare officials, non-profit organizations, etc.),* qualitative data-gathering, sensemaking workshops with stakeholders, among others.

Keywords: Transition - Covid19 - Problem Mapping - Problem Evolution - Visioning - Systems Mapping Tools - Futures.

[Abstracts in spanish and portuguese at page 51]

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[(2)] **Gideon Kossoff** is a faculty member in the School of Design and Associate Director of the Transition Design Institute at Carnegie Mellon University, Pittsburgh. His research focuses on how the relationships between humans and between the natural environment, humans, and the built/designed world are the foundation for a sustainable society. Gideon holds a PhD in design from the University of Dundee, Scotland. His thesis was entitled

"Holism and the Reconstitution of Everyday Life" through which he proposed Transition Design as a new approach to design. His argument is summarized in an essay-book "Grow Small, Think Beautiful," edited by Stephan Harding and published by Floris. Gideon teaches and advises doctoral students in Transition Design at CMU. gkossoff@andrew.cmu.edu

(3) **Tim Gasperak** works with imperative-driven public and private organizations to help them respond and thrive in the face of overwhelming complexity and uncertainty. Through his consulting practice, Strange Attractor LLC, Tim integrates complex facilitation, futures and foresight, and design methods to equip communities of people to make change together through collective sense-making, building adaptive capacity, and exploring and materializing preferred futures. His clients include U.S. Geological Survey, U.S. Environmental Protection Agency, Althingi (Parliament of Iceland), Kaiser Permanente, GE Healthcare, and Abbott Diabetes Care. Tim has a BS in Industrial Design from Ohio State University in Columbus, Ohio. tim@strange-attractor.org

About this Project, About the Research

Due to the quarantine/lock-down and limited timeframe, all research to date has been secondary[2] in nature, and the majority of sources for COVID-19-related information have come from mainstream news websites, magazines and special reports. Scientific white papers or journal articles were used whenever possible.
The Transition Design approach is based upon three steps which, together, create a radically large problem context that includes:

1. **Problem Mapping** (present)
2. **Problem Evolution** (past)
3. **Visioning** (future)

This research represents steps one and two.

1. Problem Mapping (Present)

In step one (left), the research team began to map the problem: *COVID-19 Spread and Response in the U.S.* in five categories:

- *Political / Governance Issues*
- *Economic / Business Issues*
- *Technology / Infrastructure Issues*
- *Social Issues*
- *Environmental Issues*

Problem mapping helps diverse teams develop a deep understanding of the complex interconnections and interdependencies within a system problem like COVID-19. Dynamics such as feedback loops and conflicting stakeholder agendas are often barriers to problem resolution but if understood, can be leveraged to drive positive change/resolution. Problem maps can also reveal *zones of opportunity* in which several facets of the problem intersect and offer the potential for interventions (solutions) to address multiple issues simultaneously.

A problem map is intended to serve as an ongoing, evolving knowledge reservoir for the problem and a visual representation of its complexity and internal dynamics. As knowledge from research and feedback from in terventions (solutioning) accrues and is analyzed, the map is updated to reveal new insights (indicated by red boxes on the Problem Map and at the beginning of the Evolution Map 2).

Once a cluster of key insights is identified, they are used as the basis for the second step of research: Mapping the Evolution of the Problem.

Problem maps are constructed using a variety of problem and situation-specific research methodologies that integrate both expert knowledge and perspectives from stakeholder groups affected by the problem. As previously noted, the problem map represented here is in an early stage only; both expert perspectives from interviews and research, along with stakeholder interviews, would be included in subsequent stages *(See Figure 1, unfolded Figure 1 on 1.1-1.2-1.3 and 1.4, Figures 1.5-1.6 and Figures 1.7-1.8).*

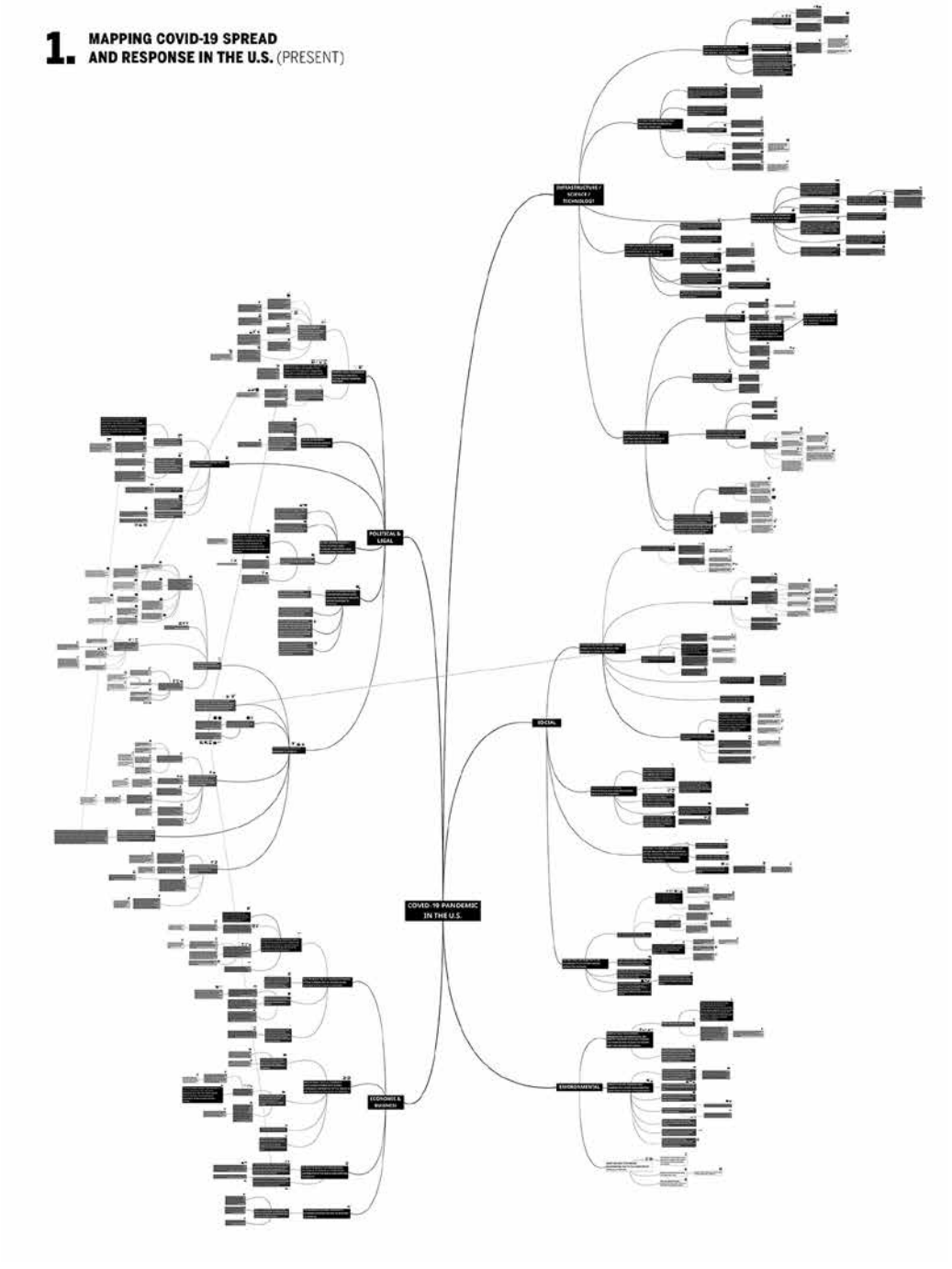
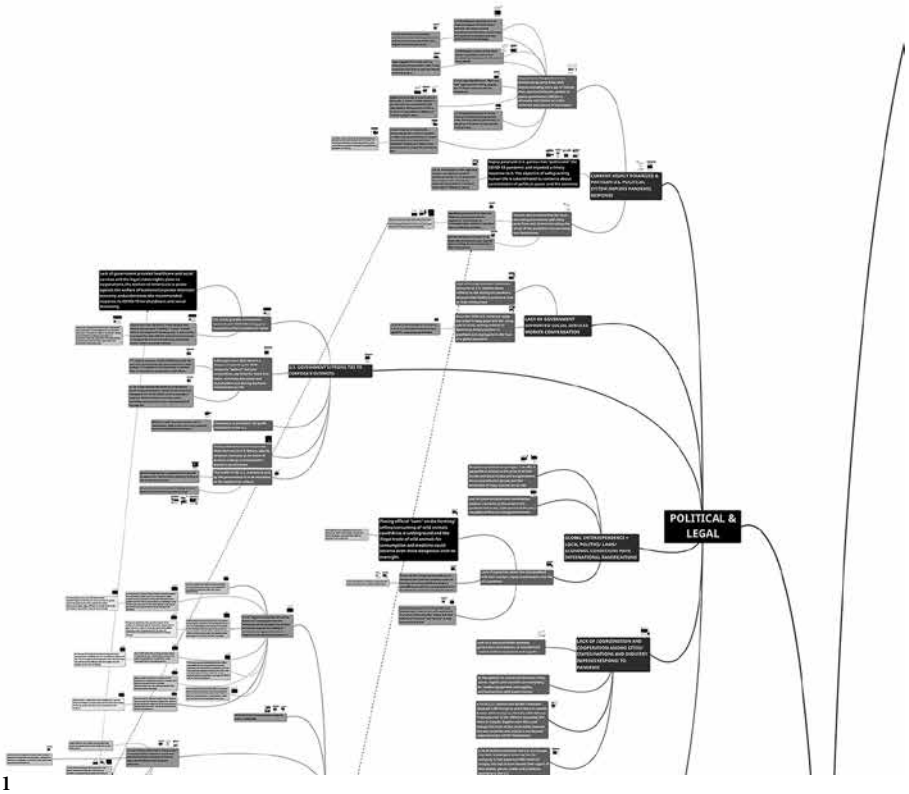


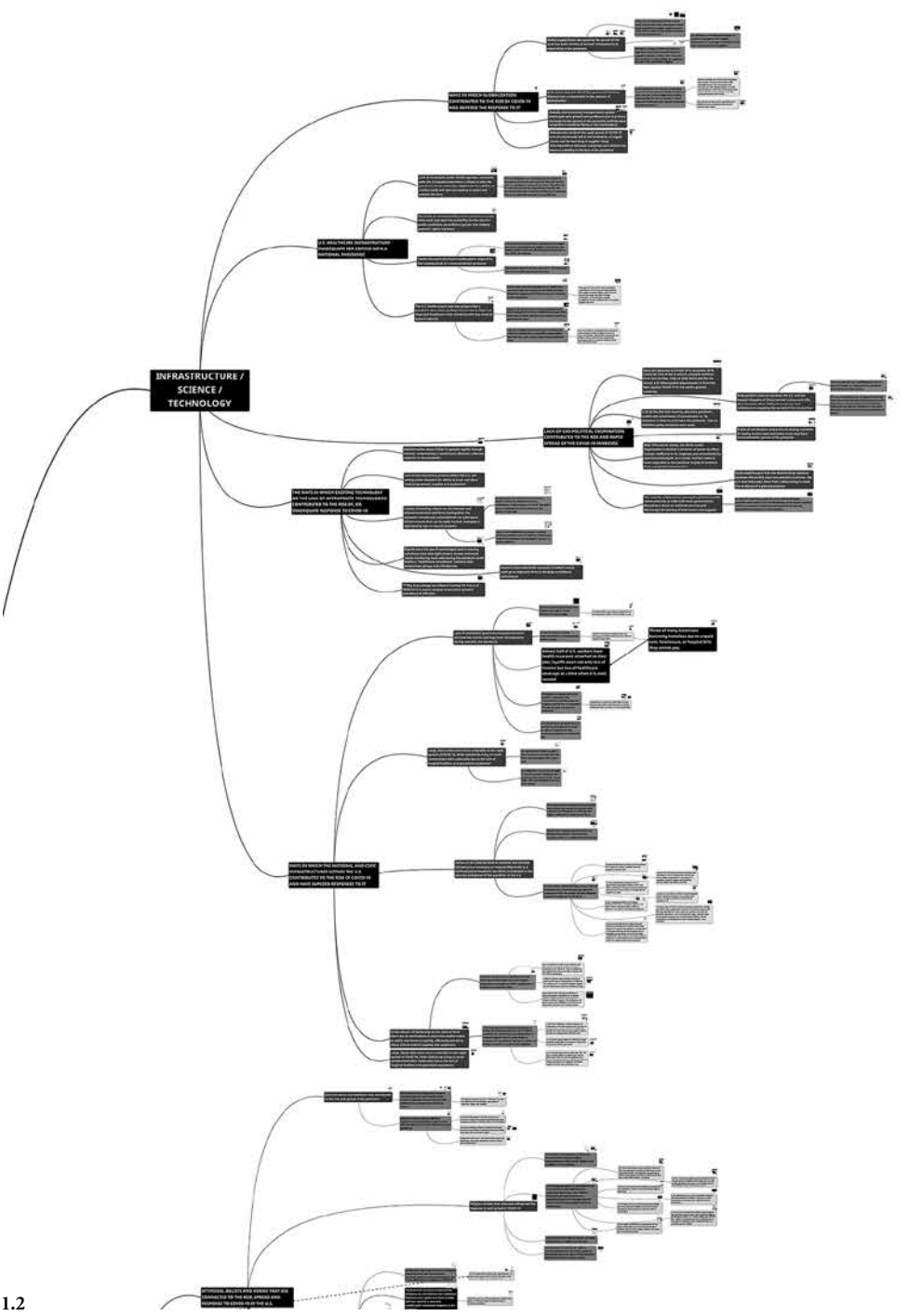
Figure 1. Mapping Covid-19 Spread and response in the US (Present). April 2020, Transition Design Institute, Carnegie Mellon University, Pittsburgh, PA. Credit: Irwin, Kossoff and Gasperak.

1. MAPPING COVID-19 SPREAD AND RESPONSE IN THE U.S. (PRESENT)



1.1

Figures 1.1, 1.2, 1.3 and 1.4. Mapping Covid-19 Spread and response in the US (Present). April 2020, Transition Design Institute, Carnegie Mellon University, Pittsburgh, PA. Credit: Irwin, Kossoff and Gasperak (Unfolded Figura 1 at 4 parts, you will see left to right in consecutive pages).



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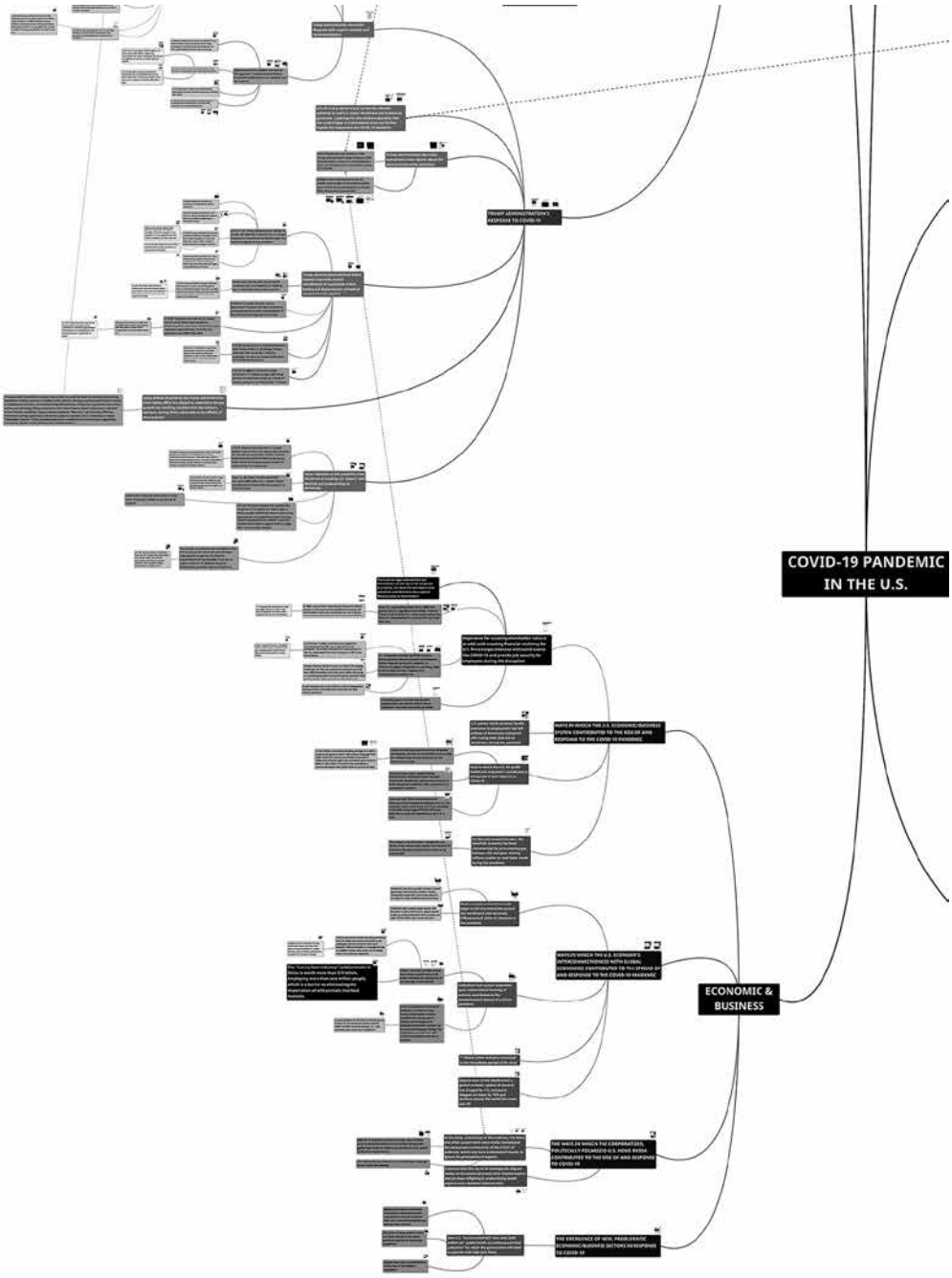

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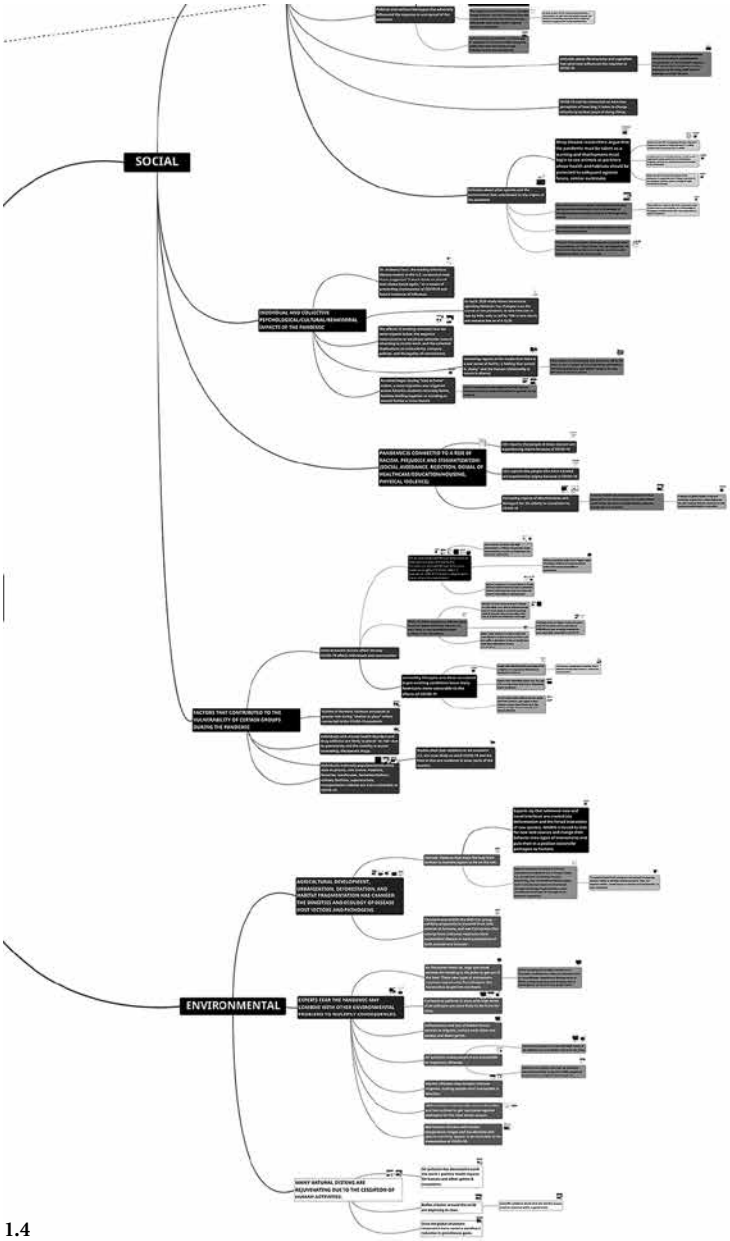
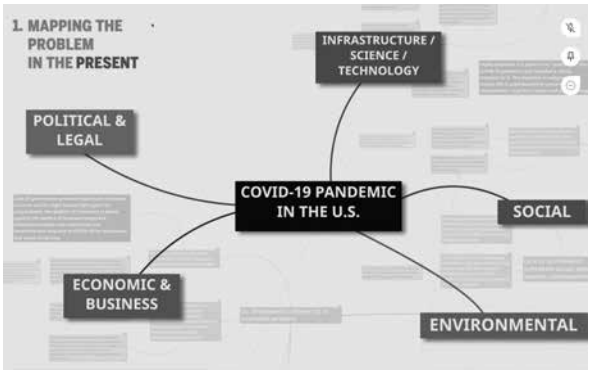

SOCIAL
INDIVIDUAL AND COLLECTIVE PSYCHOLOGICAL/CULTURAL/BEHAVIORAL ASPECTS OF THE PANDEMIC
PANDEMICS CONNECTED TO A RISE IN RACISM, PREJUDICE AND STIGMATIZATION (SOCIAL AVOIDANCE, REJECTION, ISOLATION, OF HEALTHCARE/EDUCATION/HOUSING, PHYSICAL VIOLENCE)
FACTORS THAT CONTRIBUTED TO THE VULNERABILITY OF CERTAIN GROUPS DURING THE PANDEMIC
ENVIRONMENTAL
EXPERTS FEAR THE PANDEMIC MAY SCHEDULE WITH OTHER ENVIRONMENTAL DISRUPTIONS TO YIELD EMPLY ATMOSPHERICS.
MANY NATURAL SYSTEMS ARE REJUVENATING DUE TO THE CESSATION OF HUMAN ACTIVITIES.

1.4



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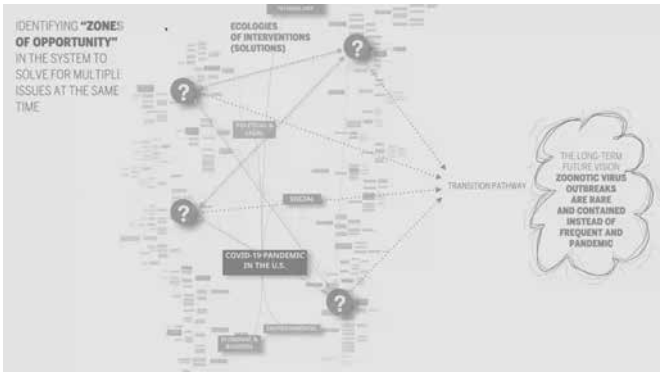
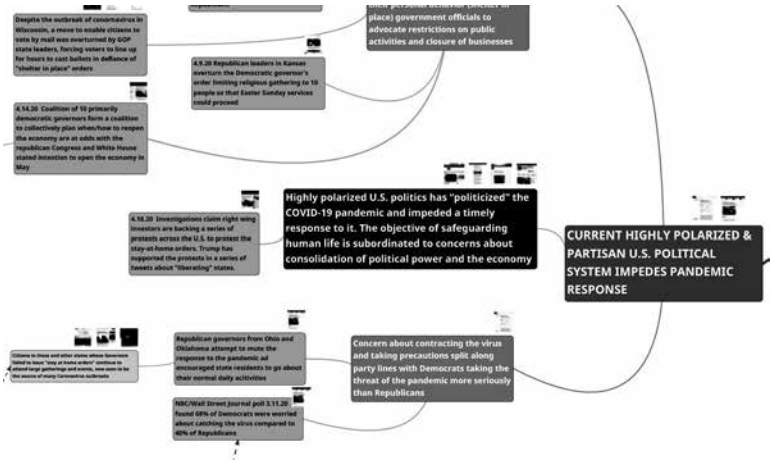


1.6

Figure 1.5 and 1.6. Transition Design Research like this aim to produce a deeper understanding of the problem and its roots and when combined with a long-term vision phase that ir co-created by stkeholders themselves. It can open up new and more effective strategies for problema resolution. The objetive is to develop ecologies of systems interventions that solve for multiple issues simultaneously. Credit: Irwin, Kossoff and Gasperak.



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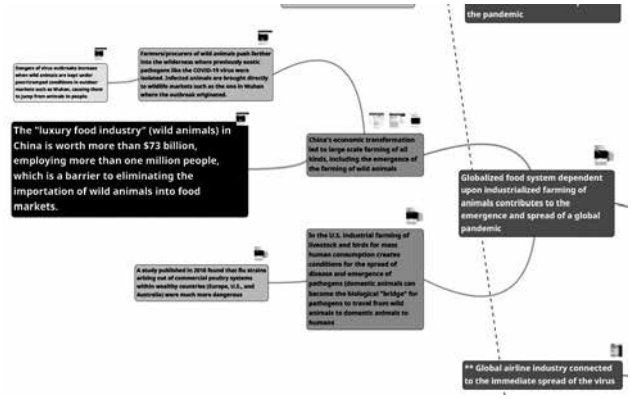


1.8

Figure 1.7 and 1.8. Mapping Covid-19 Spread details. Credit: Irwin, Kossoff and Gasperak.

2. Mapping the problem´s evolution (Past)

The second step of research used key insights from the Problem Map (red boxes) as the basis for mapping both the historic evolution of the problem *and* the socio-technical system transition within which it arose. This step is draws upon the Multi-Level-Perspective Framework (MLP) developed by researchers in Europe more than 20 years ago to explain how socio-technical systems transition over long periods of time. Three key levels are identified in which transition happens over long periods of time: the Landscape, the Regime and the Niche.

The Transition Design approach has adapted the framework to map the evolution of *the problem* and/or *the context* within which it arose (Transition Design uses the MLP in a sligh tly different way than its authors and many researcher do, in using it as the large, spatio-temporal context within which wicked problema "clusters" arise).

At left, key insights from the Problem Map were extracted to become the basis for the historical/MLP research and are situated at the beginning of the timeline. Research into their historical origins revealed new and relevant 'threads' that were also integrated into the timeline. At the top level, large events, along with cultural, collective trends, movements and norms relevant to the spread and response to COVID-19 in the U.S. are situated. The middle, Regime Level, is where the status quo (societal context) is situated. The third, Niche Level is where innovations, disruptions or new ways of doing things that challenge the status quo are found. In our map, events directly related to the pandemic itself are indicated in red. In some cases, entries on the timeline have interactive links back to the source material.

The timeline/MLP begins in the 1770s as the founding fa thers of the US were framing the Declaration of Independence and the Consti tution. These articulated various civil liberties, including freedom of assembly which was invoked by protestors against COVID-19 shutdowns and quarantines, who claimed that their civil liberties had been violated. Step three, Visioning, has not yet been undertaken, however a "placeholder vision" is indicated at the end of the timeline to demonstrate the type of co-created vision that might emerge when stakeholder groups undertake a long-term visioning exercise.

At the end of the timeline, questions that are emerging in response to the pandemic that have the potential to further shape the response and guide solutions in the near future have also been included. Like the Problem Map, MLP mapping is intended to be part of an ongoing process of: ***mapping*** > ***visioning*** > ***intervening***, with the maps serving as a visual representation of accuring knowledge about the lineage of the probl em that can inform our understanding of it in the present.

Any systems-problem will change in response to "perturbations" or solutions, which necessitates continual solutioning at all levels of scale, over short, mid and long horizons of time *(See Figure 2, unfolded Figure 2 on 2.1-2.2-2.3-2.4 and 2.5 and details on 2.6, 2.7, 2.8 and 2.9)*.

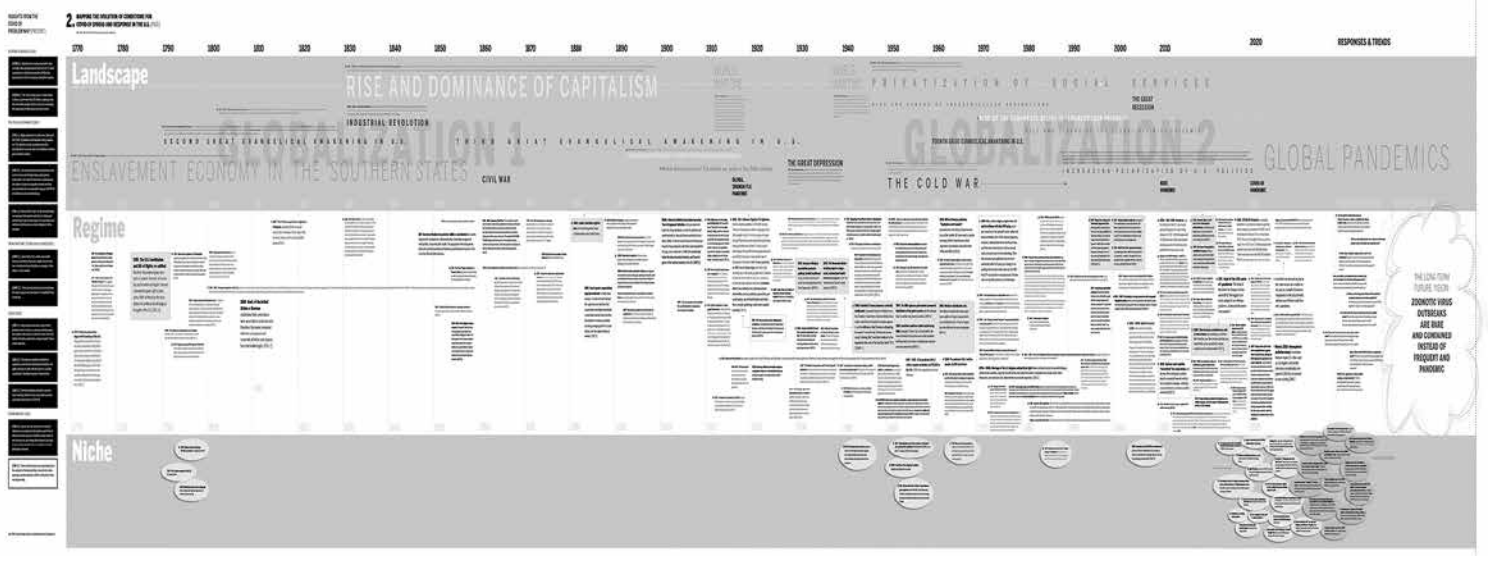


Figure 2. Mapping the evolution of conditions for Covid-19 spread and response in the US (1770-Today) (Past). April 2020, Transition Design Institute, Carnegie Mellon University, Pittsburgh, PA. Credit: Irwin, Kossoff and Gasperak.

Some descriptions inside problem´s evolution map (red boxes)
Insights from the Covid-19 Problem Map (Present, at left Figure 2)

ECONOMIC & BUSINESS ISSUES

[**ECON: 1**] Imperative for creating shareholder value is at odds with creating financial resiliency for U.S. firms/corporations to withstand events like COVID-19 and provide job security for employees during the disruption.

[**ECON: 2**] The "luxury food industry" (wild animals) in China is worth more than $73 billion, employing more than one million people, which is a barrier to eliminating the importation of wild animals into food markets

POLITICAL & GOVERNANCE ISSUES

[**POL: 1**] Highly polarized U.S. politics has "politicized" the COVID-19 pandemic and impeded a timely response to it. The objective of safe- guarding human life is subordinated to concerns about consolidation of political power and the economy.

[**POL: 2**] Lack of government provided healthcare and social services and the legal status/rights given to corporations, the welfare of Americans is pitted against the welfare of business/corporate interests/economy and undermines the recommended response to COVID-19 for shutdowns and social distancing.

[**POL: 3**] Placing official "bans" on the farming/selling/consuming of wild animals could drive it underground and the illegal trade of wild animals for consumption and medicine could become even more dangerous with no oversight.

INFRASTRUCTURE, TECHNOLOGY & SCIENCE ISSUES

[**INFR: 1**] Almost half of U.S. workers have health insurance attached to their jobs; layoffs mean not only loss of income but loss of healthcare coverage at a time when it is most needed.

[**INFR: 2**] Threat of many Americans becoming homeless due to unpaid rent, foreclosure, or hospital bills they cannot pay.

SOCIAL ISSUES

[**SOC: 1**] Many disease researchers argue that the pandemic must be taken as a warning and that humans must begin to see animals as partners whose health and habitats should be protected to safeguard against future, similar outbreaks.

[**SOC: 2**] The American mindset/constitutional emphasis on civil liberties and individual freedoms and rights have been at odds with the need for a centrally coordinated/ mandated response to the pandemic.

[**SOC: 3**] Unhealthy lifestyles and diets connected to pre-existing conditions leave many Americans more vulnerable to the effects of COVID-19.

ENVIRONMENTAL ISSUES

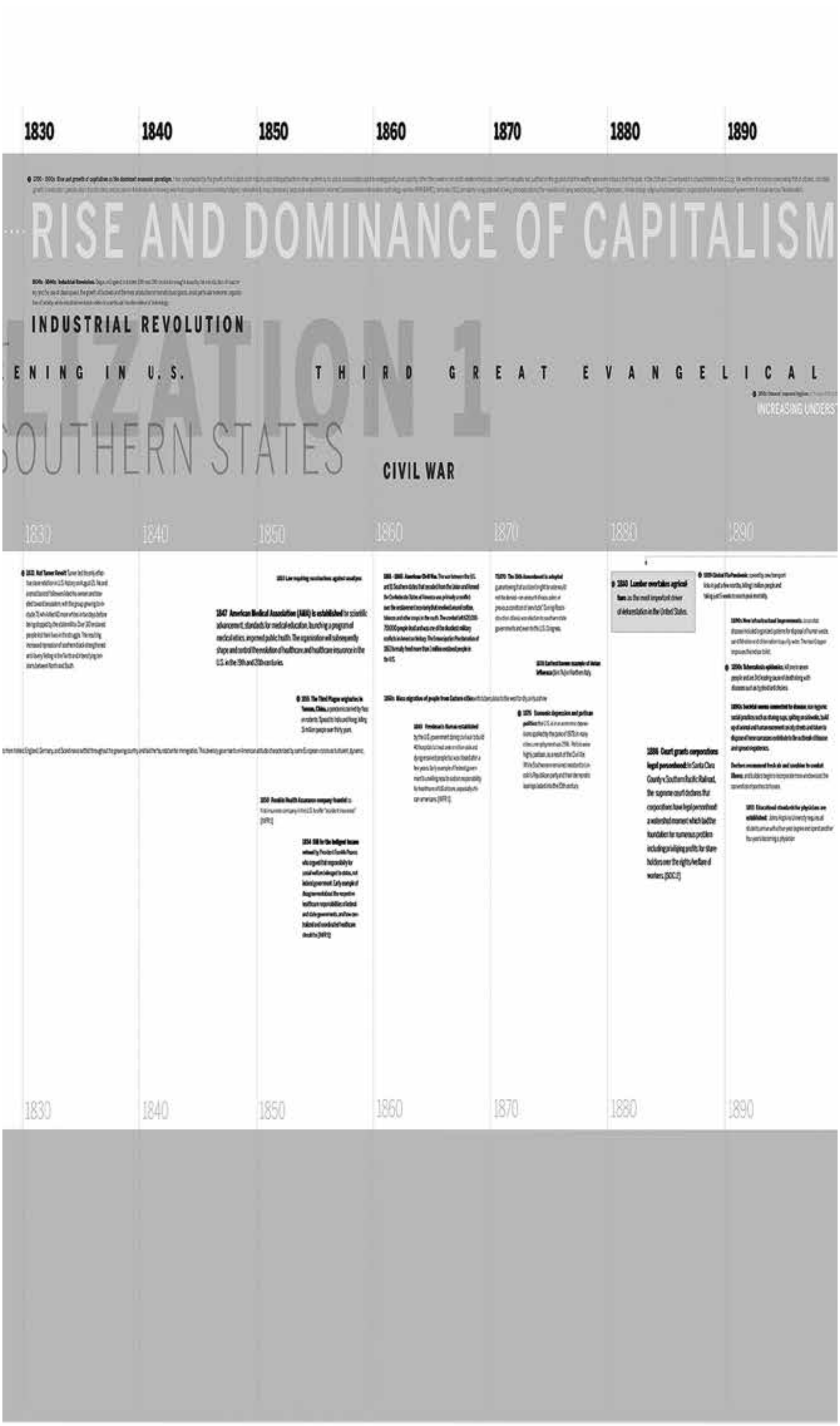
[**ENV: 1**] Experts say that whenever new and novel interfaces are created (via deforestation and the forced interaction of new species). Wildlife is forced to look for new food sources and change their behavior (new types of interactions) and puts them in a position to transfer pathogens to humans.

[**ENV: 2**] Many natural systems are rejuvenating due to the cessation of human activities: clean air/clear skies, waterways are less polluted, wildlife is returning to cities and regenerating.

Figure 2.1, 2.2, 2.3, 2.4 and 2.5. Mapping the evolution of conditions for Covid-19 spread and response in the US (1770-Today) (Past). April 2020, Transition Design Institute, Carnegie Mellon University, Pittsburgh, PA. Credit: Irwin, Kossoff and Gasperak. (Unfolded Figura 2 at 5 parts, you will see left to right in consecutive pages).


INSIGHTS FROM THE COVID-19 PROBLEM MAP (PRESENT)
2. MAPPING THE EVOLUTION OF CONDITIONS FOR COVID-19 SPREAD AND RESPONSE IN THE U.S. (PAST)
ECONOMIC & BUSINESS ISSUES
POLITICAL & GOVERNANCE ISSUES
INFRASTRUCTURE, TECHNOLOGY & SCIENCE ISSUES
SOCIAL ISSUES
ENVIRONMENTAL ISSUES
1770
1780
1790
1800
1810
1820
Landscape
SECOND GREAT EVANGELICAL AWA
ENSLAVEMENT ECONOMY IN THE
Regime
1789 The U.S. Constitution and Bill of Rights are ratified.
the First Amendment gives freedom of speech, freedom of assembly and freedom of religion. Second amendment gives right to bear arms. Both of these lay the foundation for political and ideological thought in the U.S. (SOC: 2).
1809 Bank of the United States v. Deveaux
established that corporations were associations of persons and therefore, the owners remained liable for consequences of corporate activities, and corporations had limited rights. (POL: 2)
Niche

2.1


1830
1840
1850
1860
1870
1880
1890
RISE AND DOMINANCE OF CAPITALISM
INDUSTRIAL REVOLUTION
THIRD GREAT EVANGELICAL
CIVIL WAR

2.2

1900
1910
1920
1930
1940
1950
1960
WORLD WAR ONE
WORLD WAR TWO
PRIVATIZAT
RISE AND SPREAD OF INDUSTR
AWAKENING IN U.S.
FOURTH GREAT EVANGE
THE GREAT DEPRESSION
•Global deforestation of 3.9 million sq. miles in the 20th century.
GLOBAL SPANISH FLU PANDEMIC
THE COLD WA

2.3

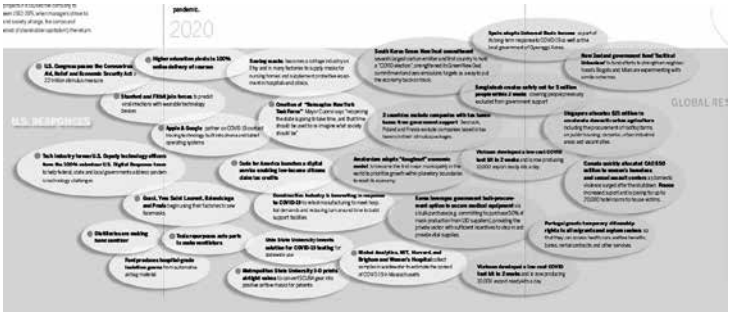
1970
1980
1990
2000
2010
2020
ON OF SOCIAL SERVICES
THE GREAT RECESSION
ALIZED AGRICULTURE
RISE OF THE CORPORATE BELIEF IN "SHAREHOLDER PRIMACY"
BALIZATION 2
RISE AND SPREAD OF THE GLOBAL HIV/AIDS EPIDEMIC
LICAL AWAKENING IN U.S.
GLOB
INCREASING POLARIZATION OF U.S. POLITICS
N1H1 PANDEMIC
COVID-19 PANDEMIC
U.S. RESPONSES


2010
2020
RESPONSES & TRENDS
R V I C E S
T
N
AIDS EPIDEMIC
N2
ATION OF U.S. POLITICS
GLOBAL PANDEMICS
N1H1
PANDEMIC
COVID-19
PANDEMIC
2010
2020
NEAR-TERM FUTURE
LONG-TERM FUTURE
2009 – 2010 H1N1 Pandemic
2017 Head of the CDC warns of a pandemic:
2020 COVID-19 Pandemic
Scientists are discovering two to four new viruses are created every year as a result of human infringement on the natural world, and any one of those could turn into a pandemic.
2016 China loosens restrictions on sale of wild animals
March, 2020 Atmospheric pollution drops
2021 Supreme court upholds "personhood" for corporations
THE LONG-TERM FUTURE VISION:
ZOONOTIC VIRUS OUTBREAKS ARE RARE AND CONTAINED INSTEAD OF FREQUENT AND PANDEMIC
U.S. RESPONSES
GLOBAL RESPONSES

2.6

2.7

2.8



2.9

Figure 2.6. Suddenly as a problema of nearly unprecedented global magnitude. You can actually watch it fracturing the regime in real time igniting a flurry of Niche level activity that is nearly imposible to follow gut which contains within the sedes of Paradigmattic change for both good and bad and as we observe this accelerated transition we´re all in we ust try to anticípate the unintended consequences of these new innovations. Credit: Irwin, Kossoff and Gasperak. **Figures 2.7 and 2.8.** Response and Trends of Near Term Future. Detail at right of Mapping the evolution of conditions for Covid-19 spread and response in the US (1770-Today) (Past). April 2020, Transition Design Institute, Carnegie Mellon University, Pittsburgh, PA. Credit: Irwin, Kossoff and Gasperak. **Figures 2.9.** US Responses and Global Responses. Detail at bottom-right of Mapping the evolution of conditions for Covid-19 spread and response in the US (1770-Today) (Past). April 2020, Transition Design Institute, Carnegie Mellon University, Pittsburgh, PA. Credit: Irwin, Kossoff and Gasperak.

The need for new Systems Mapping Tools

It is important to emphasize that appropriate mapping tools for visualizing complex systems dynamics do not, to our knowledge, yet exist. This dearth of appropriate tools that would enable transdisciplinary teams to collaborate in real time to map a system and it ***interconnections /interdependencies*** and embed resources links is likely connected to our society's inability to address systems-problems well.
Prior to beginning research, we conducted another round of exploration to look at what collaborative, cloud-based, systems-mapping tools were available. Our search found many so-called "mind-mapping" tools, but none provided the capabilities critical to this type of work which are:

1. ability for multiple researchers in multiple locations to collaborate in real time;
2. the ability to add a wide variety of nuanced connections between the nodes and clearly label them (for instance cause-effect connections, feedback, reciprocal types of connections, relations of conflict etc.);
3. ability to create clear, distinct hierarchies using color, type size and disc retionary placement of nodes and connections;
4. ability to easily change hierarchical relationships (parent, child, sibling) within the map as new insights are gained;
5. ability to embed files and links to resources into both nodes and connections that can be displayed or easily access by users/viewers;
6. ability to publish large, complex maps so they can be viewed online or can be expor ted in easily-usable formats.

The two maps produced in this scope of research have clear drawbacks due to the shortcomings of existing tools. The problem map was created in an online tool called MindMup, which does enable collaboration but becomes cumbersome and subject to "bugs" when more than one user is working in the map.
It does enable research links to be embedded, however once exported, the links are not accessible to users. When published online, the map does not enable viewers to zoom in and explore the map.
Similar problems arose in the c reation of the MLP map; tools such as Miro present limitations due to the extremely large size of these maps and inability to export to formats that enable exploration of them. Therefore, the research team worked in Google Docs to assemble the content, which was then brought into InDesign to create the final timeline/MLP. Our ongoing investigations have not shown any tool or platform with the requisite capabilities for this type of work and we welcome input from educators and researchers who may know of tools we haven't found, or who would be willing to work with us to develop systems-mapping tools.

About Transition Design

This research was conducted in order to demonstrate the Transition Design approach which is a transdisciplinary method for addressing wicked problems and for catalysing systems-level change. It has two primary objectives:

1. Development of Tools & Knowledge Sets that can aid transdisciplinary teams in organizations and communities in addressing complex, wicked problems and seeding/ catalyzing transitions toward more desirable, long-term futures.

2. Educate new generations of students in systems thinking and designing who are qualified to join these teams. Transition Design uses a variety of different tools, frameworks and knowledge sets to help students, practitioners and researchers understand and leverage systems dynamics to address wicked problems and intentionally transition communities, organizations and societies toward more sustainable, equitable and desirable long-term futures.
Transition Design is taught at the undergraduate and masters levels at the School of Design at Carnegie Mellon University and the school launched a doctoral program in Transition Design in 2014. Over 20 universities around the world are currently integrating it into coursework and research strands in a variety of disciplines and we hope to launch a Transition Design network of partner organizations in 2021.
Annual short courses in Transition Design are held for practitioners and researchers and we regularly conduct customized workshops for industry and non-profit partners who want to integrate systems thinking and transition related strategies into their workplaces, projects and initiatives. We also offer help in integrating Transition Design into existing projects and initiatives via the co-development of customized workshops, executive education and consulting.
The Transition Design Seminar for masters and doctoral students at the School of Design at Carnegie Mellon University is available as an open-source website with links to extensive readings and materials to download that can be used in the classroom and for workshops: https://transitiondesignseminarcmu.net/

Notes

1. Transition Design defines stakeholders as a member of any group adversely affected by the wicked problem in question. The approach emphasizes that ALL groups' concerns and needs must be considered in both the long-term visioning and solutioning steps, including human and non-human stakeholders. In the case of non-humans (members of the ecosystem), "advocates" must be appointed to represent those needs and concerns.
2. Here secondary research refers to articles from mainstream press, magazines, scientific journals and reports or any other published material, primarily accessed via the internet during the pandemic shutdown.

Resumen: Este proyecto fue realizado por un pequeño equipo de investigadores afiliados al Transition Design Institute de la Carnegie Mellon University, Pittsburgh, EE. UU. Es un "trabajo en progreso" compartido con un grupo específico como una introducción al enfoque de Transition Design y su conjunto de herramientas emergentes para abordar "problemas perversos" y no debe considerarse una investigación concluyente.
En marzo de 2020, cuando COVID-19 estaba emergiendo en los EE.UU. decidimos utilizar el enfoque de Diseño para la Transición para rastrear y analizar la propagación y la respuesta a la pandemia en los EE.UU. Este alcance de la investigación tiene la intención de servir como un " boceto "para orientar la investigación cualitativa adicional que involucre una variedad de métodos tales como: entrevistas a las partes interesadas (1) y a expertos (con expertos como epidemiólogos, sociólogos, historiadores, formuladores de políticas, políticos, funcionarios de salud, organizaciones sin fines de lucro, etc.), recopilación de datos cualitativos, talleres de creación de sentido con las partes interesadas, entre otros.
La investigación adicional ampliaría y validaría o refutaría los hallazgos y análisis preliminares que se muestran aquí.

Palabras clave: Transición - Covid19 - Mapeo de problemas - Evolución de problemas - Visión - Herramientas de mapeo de sistemas - Futuros.

Resumo: Este projeto foi realizado por uma pequena equipe de pesquisadores afiliados ao Transition Design Institute da Carnegie Mellon University, Pittsburgh, EUA. É um "trabalho em andamento" compartilhado com um grupo específico como uma introdução à abordagem do Transition Design e seu kit de ferramentas emergente para tratar de "problemas perversos" e não deve ser considerada uma pesquisa conclusiva.
Em março de 2020, quando o COVID-19 estava surgindo nos EUA, decidimos usar a abordagem de Design de transição para rastrear e analisar a propagação e a resposta à pandemia nos EUA. Este escopo de pesquisa tende a servir como um " sketch "para orientar futuras pesquisas qualitativas envolvendo uma variedade de métodos, tais como: partes interessadas (1) e entrevistas com especialistas (com especialistas como epidemiologistas, sociólogos, historiadores, formuladores de políticas, políticos, funcionários da saúde, organizações sem fins lucrativos, etc.), coleta de dados qualitativos, workshops de sensemaking com stakeholders, entre outros.
Pesquisas futuras ampliariam e validariam ou refutariam as descobertas e análises preliminares mostradas aqui.

Palavras chave: Transição - Covid19 - Mapeamento de problema - Evolução do problema - Visão - Ferramentas de mapeamento de sistemas - Futuros.