

**Thinking about technology,  
*systemically***

Anna e só



**I'm one of the cool folks organizing Outreachy.**

**“Outreachy provides paid, remote internships to people subject to systemic bias and impacted by underrepresentation in the technical industry where they are living.”**

Outreachy's mission statement (see [outreachy.org](https://outreachy.org))

“Outreachy provides paid, remote internships to people subject to ***systemic*** bias and impacted by underrepresentation in the technical industry where they are living.”

**“Systems are a set of elements  
dynamically interrelated...”**

**... to perform activities aiming at  
achieving a specific goal...**

**... while consuming energy, materials or data (input) and producing new forms of energy, materials or data (output).”**

**– L.V. Bertalanffy in *General System Theory: Foundations, Development, Applications* (1974) (as cited by V. V. G. Neto, R. Araújo, R. P. dos Santos in *New Challenges in the Social Web: Towards Systems-of-Information Systems Ecosystems*, 2017)**

**“Rather than reducing an entity to  
the properties of its parts or  
elements...”**



**... systems theory focuses on the arrangement of and relations between the parts which connect them into a whole.”**

– F. Heylighen and C. Joslyn in *What is Systems Theory?*  
published on *Principia Cybernetica Web* (1992)

**“The bigger picture.”**

**Those ideas are proposed in  
opposition to what some authors  
may call “conventional thinking”  
or “reductionist thinking”.**

**Conventional thinking  
reduces a complex world to  
its parts.**

**Conventional thinking  
assumes *stability*,  
*predictability*, *objectivity*.**

**Systems thinking embraces  
*uncertainty, instability,  
intersubjectivity.***

*Martin Reynolds and Sue Holwell in Introducing Systems Approaches, "Messes and Difficulties" (p. 5-6) (2020)*



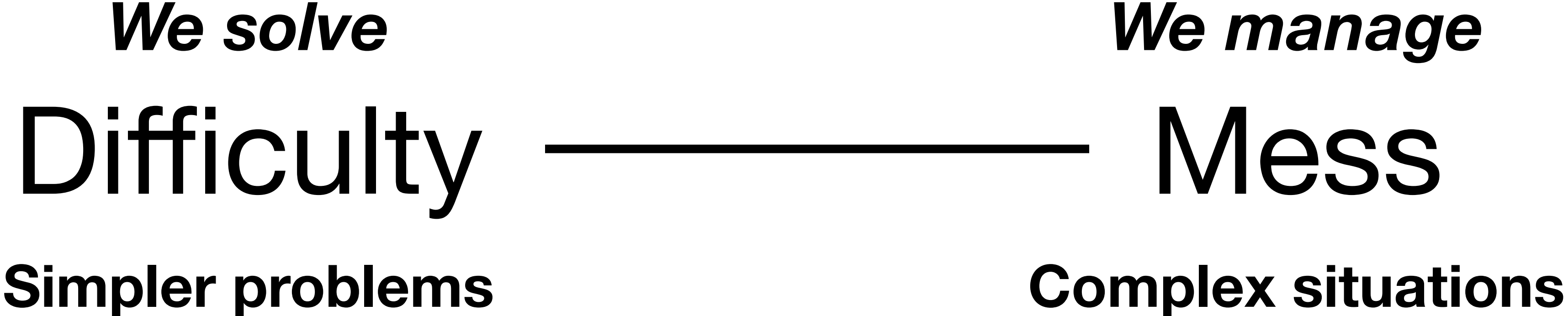
*Martin Reynolds and Sue Holwell in Introducing Systems Approaches, "Messes and Difficulties" (p. 5-6) (2020)*

**Difficulty** —————



**Difficulty** ————— **Mess**





# Mess

- Serious implications
- Multiple actors
- Interconnected factors
- Longer time scale

**Conventional thinking is  
great at solving difficulty, but  
terrible at managing messes.**

**We may ignore  
interconnections.**

**We may assume a *single*  
causation.**

**We may assume *a single  
person* is to blame.**



**We may focus on *outcomes*,  
not on the *process*.**

**Worldview:  
I'm partially sighted.**

**Worldview: Technology as a  
bridge to autonomy.**

**Conflict: Accessibility is one of the major targets of regression in technology.**

**Factor: Decisions taken  
without considering their  
impact on the whole.**

**Factor: Accessibility tools are  
of no use if the software we  
use isn't accessible.**

**Factor: Accessibility as an  
“extra feature”, not a  
requirement.**

**Factor: Accessibility as a  
specialty, not a commonality.**



**Medical model of disability:  
Disability as a deviation.**

**Social model of disability:  
Disability as a social  
experience.**

**Those factors are *structural*.**

**They all have social, economic,  
and political origins,  
repercussions, and implications.**

**Technology doesn't exist in  
an isolated reality.**

**Systemic problems require  
systems thinking to promote  
*true systemic change.***

*Martin Reynolds and Sue Holwell in Introducing  
Systems Approaches, “Towards Purposeful Systems  
Thinking in Practice” (p. 17-18) (2020)*

**Make sense of relationships.  
*Understand* in order to  
improve.**

*Martin Reynolds and Sue Holwell in Introducing  
Systems Approaches, “Towards Purposeful Systems  
Thinking in Practice” (p. 17-18) (2020)*

**Surface and engage  
contrasting perspectives and  
worldviews.**



*Martin Reynolds and Sue Holwell in Introducing  
Systems Approaches, “Towards Purposeful Systems  
Thinking in Practice” (p. 17-18) (2020)*

**Explore and reconcile power  
relations, boundary issues,  
and potential conflicts.**

**“Gently *disrupt, unsettle*, and thereby *provoke* new systems thinking.”**

– Martin Reynolds and Sue Holwell in *Introducing Systems Approaches*,  
“Towards Purposeful Systems Thinking in Practice” (p. 18) (2020)

**Organize, *intently*.**

**Think, *systemically*.**

**Change, *radically*.**

**“A systems approach begins when first you see the world through the eyes of another.”**

– C. West Churchman in *The systems approach*, p. 231 (1968) (as cited by Martin Reynolds and Sue Holwell in *Introducing Systems Approaches* (p. 8), 2020)

**Thank you!**

**References and recommended reading:**  
`notapplicable.dev/systemic`