



THE UNIVERSITY OF  
**NEWCASTLE**  
AUSTRALIA



International Society  
for Systems and Complexity  
Sciences for Health

**AfroPHC Workshop**  
Exploring Complexities in PHC for UHC in Africa  
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**“HOW BEST CAN WE USE COMPLEXITY THEORY TO SUPPORT PRIMARY HEALTH CARE TEAMWORK FOR UNIVERSAL HEALTH COVERAGE IN AFRICA?”**

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# COMPLEXITY

*From Latin: complectere*  
INTERWOVEN  
INTERCONNECTED

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Alexander von Humboldt  
(1769-1859)

## A Way of Thinking

If **everything is connected**, then it was important to examine the differences and similarities **without losing sight of the whole**.

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**System Boundaries**

**Interconnectedness**

**Feedback**

**Impact of Starting (Initial) Condition**

$A = a$   
 $A' = a + 0.01$

## Complexity Principles

**Structure**

- Bounded
- Interconnected

**Dynamics**

- Interactions are multi-directional and result in feedback
- Interactions are sensitive to initial conditions

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# Organisations are Systems

A System is a **WHOLE** that cannot be divided into independent parts.

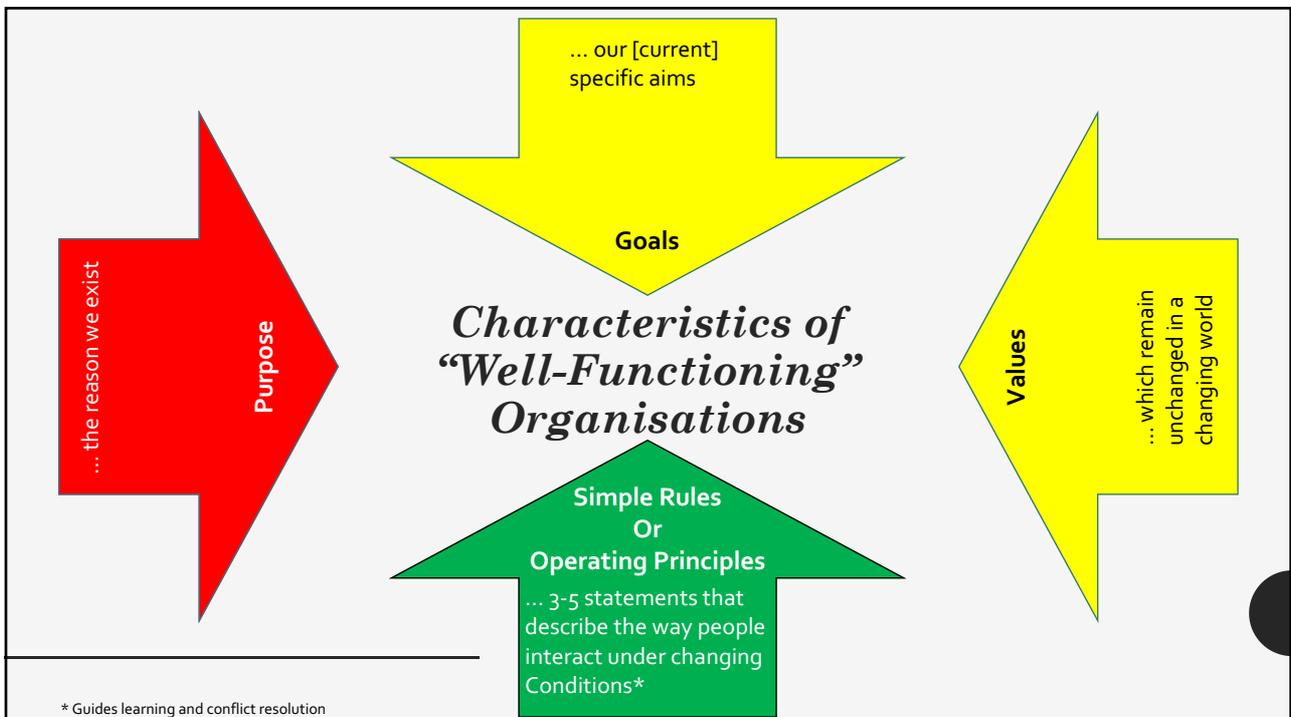
and

A system's **PROPERTIES** are not present in its parts.



Russell Ackoff  
(1919-2009)

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## Organisations – a complex dynamic perspective

### Vortex as a metaphor

A vortex can ONLY arise from a FOCAL POINT (= purpose)

While the structure and dynamics along the vortex change (= organisational layers with specific functions), they all work towards the common purpose

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### HOW WE THINK

**WHO KNOWS WHAT**

- 4% of problems are known to top managers
- 9% of problems are known to middle managers
- 74% of problems are known to supervisors
- 100% of problems are known to frontline workers

**PROBLEM IDEATION BASED ON**

- FORMAL POLICIES
- UNspoken RULES
- UNconscious RULES

What is seen

What is NOT readily seen or valued

What SHOULD be learnt

### HOW WE ACT

**PROBLEM IDENTIFICATION**

- React
- Anticipate
- Design
- Transform

What HAS BEEN learnt

**CAS CHARACTERISTICS**

- FORMAL PRACTICES
- INFORMAL PRACTICES
- CORE VALUES

System Manifestation

Emergent Phenomena

System Foundations

Do you know the purpose, goals and values in your organisation?

Do you know how to interact?

Awareness is Key

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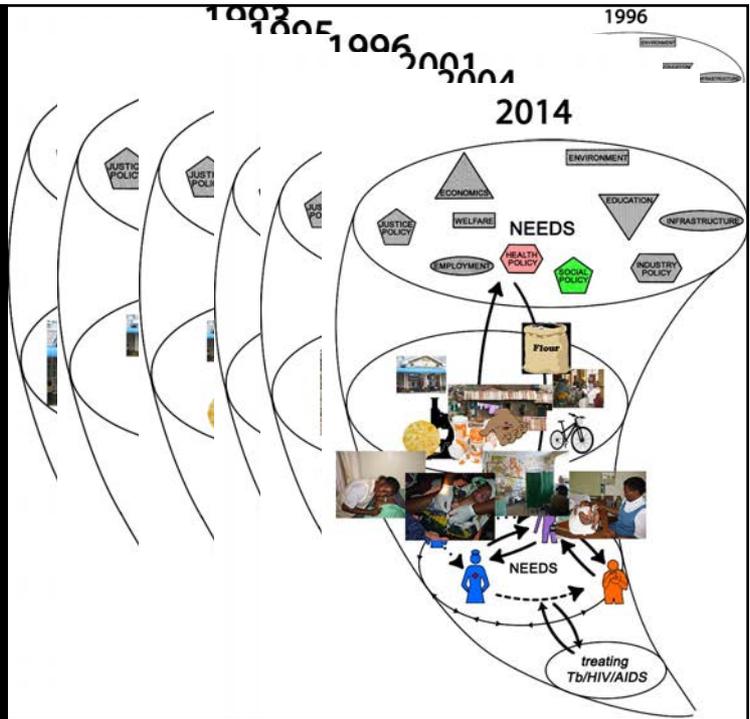
# When an organisation knows its purpose

Building a needs-focused complex-adaptive health system (Eastern Deanery AIDS Relief Program approaches, Nairobi, Kenya)

The FOCUS (= purpose) was maintained over time, new aims (= goals) emerged over time and required new and/or additional structures resulting in different dynamics

Outcomes – a *de novo* development of a primary care system

Sturmberg JP, Njoroge A. People-centred health systems, a bottom-up approach: where theory meets empiry. J Eval Clin Pract. 2017;23(2):467-73. <https://doi.org/10.1111/jep.12540>



- Organisations are **COMPLEX ADAPTIVE SYSTEMS**
- Every Complex Adaptive Organisation has a **CORE FOCUS – What is our PURPOSE?**
- The Vortex Model Offers a Useful Reminder for **ALL MEMBERS** to Keep their Eye on the Purpose of the Organisation

## KEY MESSAGES

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Sturmberg JP, Picard M, Aron DC, Bennett JM, Bircher J, deHaven MJ, et al. Health and Disease—Emergent States Resulting from Adaptive Social and Biological Network Interactions. *Frontiers in Medicine.* 2019;6:59. <https://dx.doi.org/10.3389/fmed.2019.00059>

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### Books

Sturmberg JP, Martin CM. *Handbook of Systems and Complexity in Health.* New York: Springer; 2013.

Sturmberg JP. *Health System Redesign. How to Make Health Care Person-Centered, Equitable, and Sustainable.* Cham, Switzerland: Springer; 2018.

Heifetz R. *Leadership Without Easy Answers.* Cambridge, Ma: Harvard University Press; 1994.

## REFERENCES