



Research and Adaptive Action: Discovery in Complex Systems

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Nothing is intractable.



Today We Will Explore . . .

- ▶ WHAT is the challenge of research in complex systems?
- ▶ SO WHAT is the future of research?
- ▶ NOW WHAT will enable such research?





WHAT
is the challenge?



Research: What do we mean?

Contribute to the body of human knowledge

- ▶ Objective, evidence-, fact-based
- ▶ Minimal (or acknowledged) bias
- ▶ Developed within disciplinary lines
- ▶ Quantitative and qualitative
- ▶ Pure and applied
- ▶ Theory development and theory testing
- ▶ Physical sciences and social sciences
- ▶ Peer reviewed and published in journals
- ▶ Normal science and paradigm-shifting science
 - ▶ Incremental improvement on existing theory
 - ▶ Basic assumptions unchanged
 - ▶ Methods may shift, but questions don't



Complexity Shifts Paradigms

Traditional Research Paradigm	Complexity Research Paradigm
Certainty	Deep uncertainty
Predictable	Surprising
Consistent	Variable
Single scale	Multiple
Limited, knowable variables	Unlimited, unknowable
Dependent/independent variables	Interdependent
Replicable	Unique
Reversible time	Irreversible time
Disciplinary discourses	Interdisciplinary
Normal distribution	Long tail
Single, definitive view	Multiple, valid
Precision improves accuracy	May degrade accuracy



What do we lose?

Generalizability:

- Population consistency
- Interaction of subject selection and research
- Descriptive explicitness of the independent variable
- Effect of the research environment
- Researcher or experimenter effects
- Data collection methodology
- The effect of time

Replicability:

- Subject variability
- Size of subject population
- Time given for the data collection
- Time given for experimental treatment
- History
- Attrition
- Maturation
- Instrument/task sensitivity



Why is this so important now?

- ▶ Sustainable Development Goals require it
- ▶ Scientific breakthroughs are happening between disciplines
- ▶ Dominant voices are being recognized as destructive
- ▶ Change is coming too quickly to allow traditional research
- ▶ Crisis is not replicable or reproducible
- ▶ Theory and practice are diverging
- ▶ Technology opens possibilities





SO WHAT
is the future of research?



Research in complex systems is:



Research in complex systems is:

- ▶ Radically local, not generalizable



Radically Local





Research in complex systems is:

- ▶ Radically local, not generalizable
- ▶ Pattern-based, not data-based



Pattern-Based





Research in complex systems is:

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- ▶ Pattern-based, not data-based
- ▶ Common language, not specialized



Common Language





Research in complex systems is:

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Interdisciplinary





Research in complex systems is:

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- ▶ Interdisciplinary, not discipline bound
- ▶ Praxis-based, not pure or applied



Praxis-Based





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- ▶ Praxis-based, not pure or applied
- ▶ Interpreted, not applied directly



Interpreted



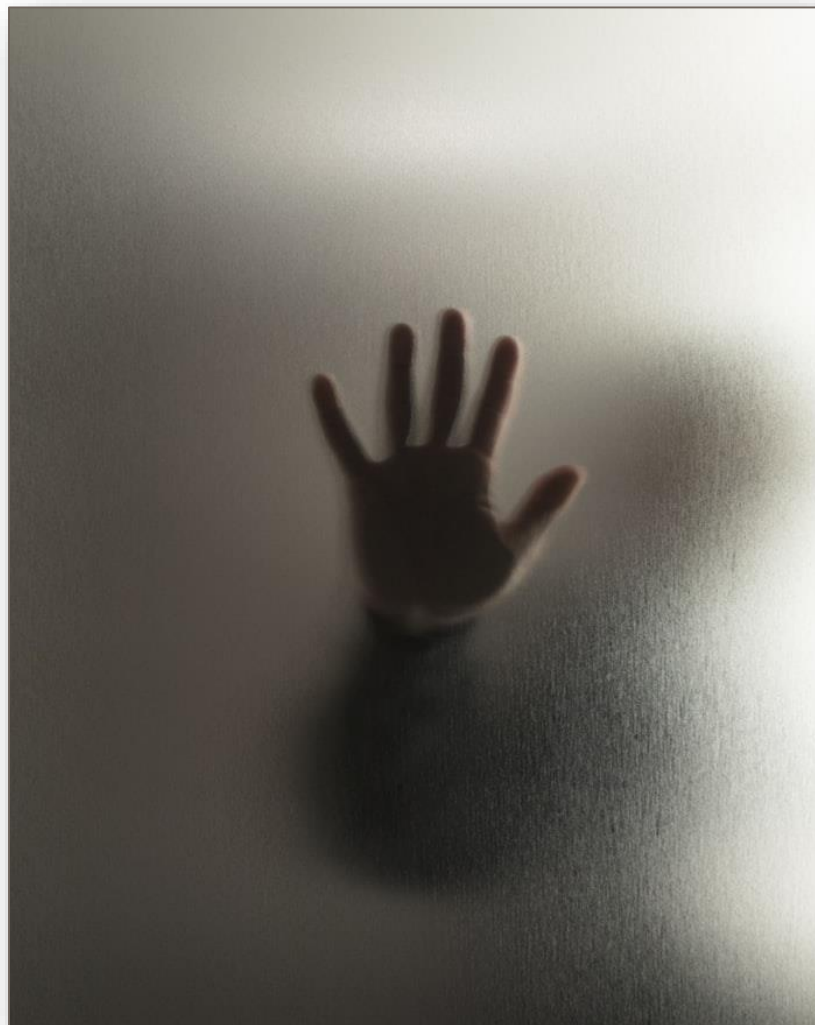


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Collective





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- ▶ Discovering better questions, not answers



Discovering Better Questions





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- ▶ Discovering better questions, not answers
- ▶ Proven in demonstration, not derivation



Proven in Demonstration





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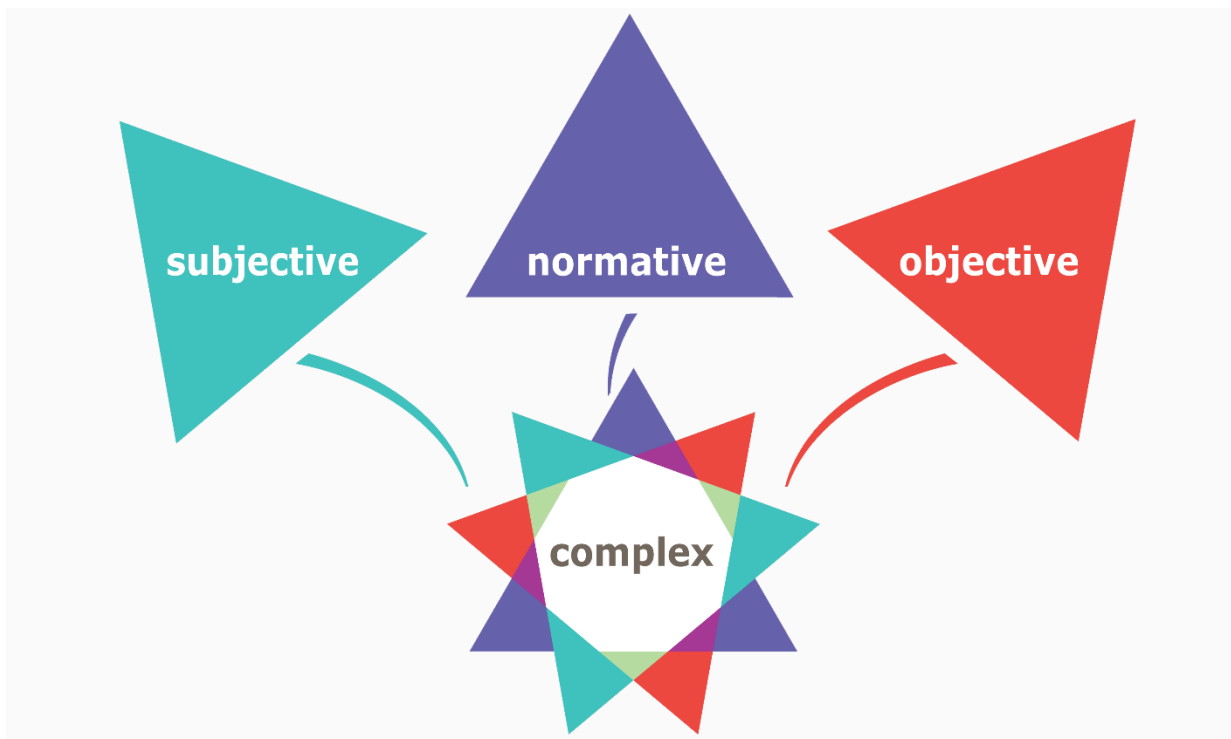
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NOW WHAT
will enable such research?

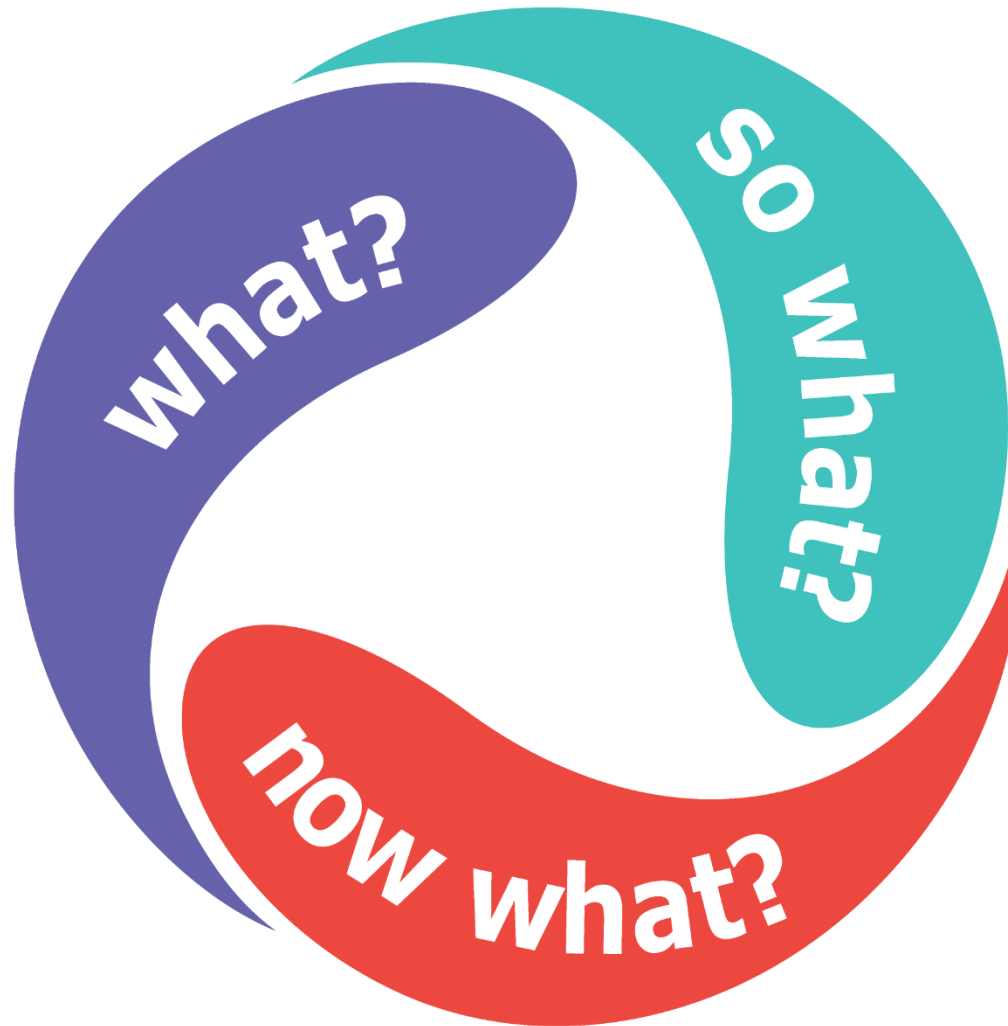


Four Truths



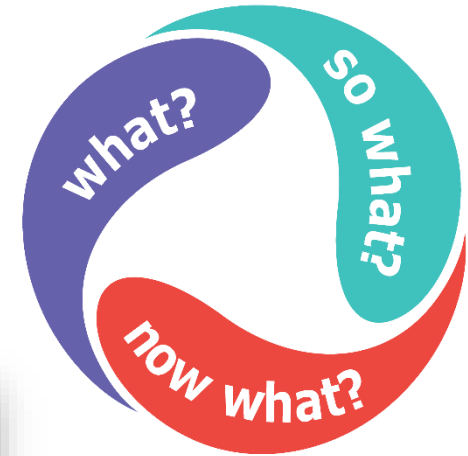
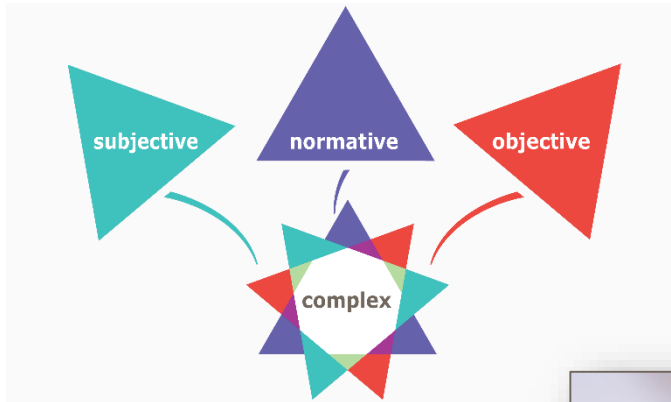


Adaptive Action





NOW WHAT Is Your Research Journey?





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Other Resources

- ▶ *Adaptive Action: Leverage Uncertainty in Your Organization* (Eoyang & Holladay, 2013)
- ▶ *Facilitating Organization Change: Lessons from Complexity Science* (Olson & Eoyang, 2001)
- ▶ Free monthly webinars (1-hr session)
- ▶ Frequent Adaptive Action Labs (2, 3-hr sessions)
- ▶ Certification Training (virtual and in person)
- ▶ www.hsdinstitute.org
- ▶ Join our community to receive regular mailings