

definition - wicked problem

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Wicked problem

update

"Wicked problem" is a phrase originally used in social [planning](#) to describe a problem that is difficult or impossible to solve because of incomplete, contradictory, and changing requirements that are often difficult to recognize. The term 'wicked' is used, not in the sense of evil, but rather its resistant to resolution.^[1] Moreover, because of complex [interdependencies](#), the effort to solve one aspect of a wicked problem may reveal or create other problems.

[C. West Churchman](#) introduced the concept of wicked problems in a "Guest Editorial" of Management Science (Vol. 14, No. 4, December 1967) by referring to "a recent seminar" by Professor Horst Rittel, and discussing the moral responsibility of [Operations Research](#) "to inform the manager in what respect our 'solutions' have failed to tame his wicked problems". [Horst Rittel](#) and [Melvin M. Webber](#) formally described the concept of wicked problems in a 1973 [treatise](#), contrasting "wicked" problems with relatively "tame," soluble problems in [mathematics](#), [chess](#), or [puzzle](#) solving.^[2]

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Formal definitions

Rittel and Webber's 1973 formulation of wicked problems in social policy planning specified ten characteristics:^{[2][3]}

1. There is no definitive formulation of a wicked problem (defining wicked problems is itself a wicked problem)
2. Wicked problems have no [stopping rule](#).
3. Solutions to wicked problems are not [true-or-false](#), but better or worse.
4. There is no immediate and no ultimate test of a solution to a wicked problem.
5. Every solution to a wicked problem is a "one-shot operation"; because there is no opportunity to learn by [trial and error](#), every attempt counts significantly.
6. Wicked problems do not have an enumerable (or an exhaustively describable) set of potential solutions, nor is there a well-described set of permissible operations that may be incorporated into the plan.
7. Every wicked problem is essentially unique.
8. Every wicked problem can be considered to be a symptom of another problem.
9. The existence of a discrepancy representing a wicked problem can be explained in numerous ways. The

choice of explanation determines the nature of the problem's resolution.

10. The planner has no right to be wrong (planners are liable for the consequences of the actions they generate)

Conklin later generalized the concept of problem wickedness to areas other than planning and policy. The defining characteristics are:^[4]

1. The problem is not understood until after the formulation of a solution.
2. Wicked problems have no stopping rule.
3. Solutions to wicked problems are not right or wrong.
4. Every wicked problem is essentially novel and unique.
5. Every solution to a wicked problem is a 'one shot operation.'
6. Wicked problems have no given alternative solutions.

Problem examples

Classic examples of wicked problems include [economic](#), [environmental](#), and [political](#) issues. A problem whose solution requires a great number of people to change their mindsets and behavior is likely to be a wicked problem. Therefore, many standard examples of wicked problems come from the areas of public planning and policy. These include global [climate change](#)^[5], [natural hazards](#), [healthcare](#), the [AIDS](#) epidemic, [pandemic influenza](#), international [drug trafficking](#), [homeland security](#), [nuclear weapons](#), and [nuclear energy](#) and waste.

In recent years, problems in many areas have been identified as exhibiting elements of wickedness - examples range from aspects of design decision making and [knowledge management](#)^[6] to [business strategy](#).^[7]

Background and context

Rittel and Webber coined the term in the context of problems of social policy, an arena in which a purely scientific-rational approach cannot be applied because of the lack of a clear problem definition and differing perspectives of stakeholders.^[2] In their words, "*The search for scientific bases for confronting problems of social policy is bound to fail because of the nature of these problems...Policy problems cannot be definitively described. Moreover, in a pluralistic society there is nothing like the indisputable public good; there is no objective definition of equity; policies that respond to social problems cannot be meaningfully correct or false; and it makes no sense to talk about 'optimal solutions' to these problems...Even worse, there are no solutions in the sense of definitive answers.*"

Thus wicked problems are also characterised by the following:

1. The solution depends on how the problem is framed and vice-versa (i.e. the problem definition depends on the solution)
2. [Stakeholders](#) have radically different world views and different frames for understanding the problem.
3. The constraints that the problem is subject to and the resources needed to solve it change over time.
4. The problem is never solved definitively.

Although Rittel and Webber framed the concept in terms of social policy and planning, wicked problems occur in any domain involving stakeholders with differing perspectives.^[4] Recognising this, Rittel and Kunz developed a technique called [Issue-Based Information System](#) (IBIS), which facilitates documentation of the rationale behind a group decision in an objective manner.^[8]

A recurring theme in research and industry literature is the connection between wicked problems and design.^{[9][10]} Design problems are typically wicked because they are often ill defined (no prescribed way forward), involve [Stakeholders](#) with different perspectives, and have no "right" or "optimal" solution.^[11] Thus wicked problems cannot be solved by the application of standard (or known) methods; they demand creative solutions.^[12]

Strategies to tackle wicked problems

Wicked problems cannot be tackled by the traditional approach in which problems are defined, analysed and solved in sequential steps. The main reason for this is that there is no clear problem definition of wicked problems. In a paper published in 2000, Roberts identifies the following strategies to cope with wicked problems:^[13]

- Authoritative

These strategies seek to tame wicked problems by vesting the responsibility for solving the problems in the

hands of a few people. The reduction in the number of stakeholders reduces problem complexity, as many competing points of view are eliminated at the start. The disadvantage is that authorities and experts charged with solving the problem may not have an appreciation of all the perspectives needed to tackle the problem.

- **Competitive**

These strategies attempt to solve wicked problems by pitting opposing points of view against each other, requiring parties that hold these views to come up with their preferred solutions. The advantage of this approach is that different solutions can be weighed up against each other and the best one chosen. The disadvantage is that this adversarial approach creates a confrontational environment in which knowledge sharing is discouraged. Consequently, the parties involved may not have an incentive to come up with their best possible solution.

- **Collaborative**

These strategies aim to engage all stakeholders in order to find the best possible solution for all stakeholders. Typically these approaches involve meetings in which issues and ideas are discussed and a common, agreed approach is formulated.

In his 1972 paper, ^[14] Rittel hints at a collaborative approach; one which attempts, "...to make those people who are being affected into participants of the planning process. They are not merely asked but actively involved in the planning process..." A disadvantage of this approach is that achieving a shared understanding and commitment to solving a wicked problem is a time-consuming process. Research over the last two decades has shown the value of computer assisted argumentation techniques in improving the effectiveness of cross-stakeholder communication. ^[15] More recently, the technique of dialogue mapping has been used in tackling wicked problems in organizations using a collaborative approach. ^[16]

Problem Structuring Methods

A range of so-called Problem Structuring Methods have been developed in [Operations Research](#) since the 1970s to address problems involving complexity, uncertainty and conflict.

Related concepts

Messes and social messes

[Russell L. Ackoff](#) wrote about complex problems as messes: "Every problem interacts with other problems and is therefore part of a set of interrelated problems, a system of problems... I choose to call such a system a mess." ^[17] Extending Ackoff, [Robert Horn](#) says that "a Social Mess is a set of interrelated problems and other messes. Complexity—systems of systems—is among the factors that makes Social Messes so resistant to analysis and, more importantly, to resolution."

According to Horn, the defining characteristics of a social mess are: ^[18]

1. No unique "correct" view of the problem;
2. Different views of the problem and contradictory solutions;
3. Most problems are connected to other problems;
4. Data are often uncertain or missing;
5. Multiple value conflicts;
6. [Ideological](#) and cultural constraints;
7. Political constraints;
8. Economic constraints;
9. Often a-logical or illogical or multi-valued thinking;
10. Numerous possible intervention points;
11. Consequences difficult to imagine;
12. Considerable uncertainty, ambiguity;
13. Great resistance to change; and,
14. Problem solver(s) out of contact with the problems and potential solutions.

Wicked problems in software development

In 1990 DeGrace and Stahl introduced the concept of wicked problems to [software development](#).^[19] In the last decade, other [computer scientists](#)^{[20][21]} have pointed out that software development shares many properties with other [design](#) practices (particularly that people-, [process](#)-, and [technology](#)-problems have to be considered equally), and have incorporated Rittel's concepts into their [software design](#) methodologies. The design and integration of complex software-defined services that use the Web ([web services](#)) can be construed as an evolution from previous models of software design, and therefore becomes a wicked problem also.

Super wicked problems

K. Levin, et al. introduced the distinction between "wicked" and "super wicked problems" in their discussion of [global climate change](#).^[22], revised and published in 2012, "Overcoming the tragedy of super wicked problems: constraining our future selves to ameliorate global climate change" Policy Sciences (May). They define super wicked problems as having the following additional characteristics:

1. Time is running out.
2. No central authority.
3. Those seeking to solve the problem are also causing it.
4. Policies discount the future irrationally.

While the items that define a wicked problem relate to the problem itself, the items that define a super wicked problem relate to the agent trying to solve it. Global warming as a super wicked problem, and the need to intervene to tend to our longer term interests, has also been taken up by others, including Lazarus^[23].

See also

- [Business Decision Mapping](#)
- [Collaborative software](#)
- [Collaborative information seeking](#)
- [Compendium \(software\)](#)
- [Computational sociology](#)
- [Computational complexity theory](#)
- [Computer simulation](#)
- [Creative problem solving](#)
- [Critical thinking](#)
- [Decision making](#)
- [Decision problem](#)
- [Design](#)
- [Design Rationale](#)
- [Douglas Engelbart](#)
- [Drama Theory](#)
- [Dream argument](#)
- [Heuristic](#)
- [Issue-Based Information System](#)
- [Morphological analysis](#)
- [Planning](#)
- [Post-normal science](#)
- [Problem solving](#)
- [Robert E. Horn](#)
- [Russell L. Ackoff](#)
- [Scenario planning](#)
- [Small Is Beautiful](#)
- [Social entrepreneurship](#)
- [Soft systems methodology](#)
- [Structured Systems Analysis and Design Method](#)
- [Systems analysis](#)
- [System dynamics](#)
- [Systems thinking](#)
- [Systems theory](#)
- [Twelve leverage points](#)

Notes

1. [^] ["Tackling Wicked Problems: A Public Policy Perspective"](#). Australian Public Service Commission. 25 October 2007.
2. [^] [a b c](#) Rittel 1973
3. [^] Ritchey 2007
4. [^] [a b](#) Conklin 2005
5. [^] Hulme 2007
6. [^] Courtney 2008
7. [^] Camillus 2008
8. [^] Kunz 1970
9. [^] Rittel 1988
10. [^] Stolterman 2008
11. [^] Conklin 2005, Chapter 1
12. [^] Conklin 2007, Part 1 and Part 2
13. [^] Roberts 2000
14. [^] Rittel 1972
15. [^] Shum 2003
16. [^] Conklin 2003
17. [^] Ackoff 1974
18. [^] Horn 2007
19. [^] DeGrace 1990
20. [^] Conklin 2003b
21. [^] Sølvsberg 1993
22. [^] Levin 2009
23. [^] Lazarus 2009

References

- Ackoff, Russell, "Systems, Messes, and Interactive Planning" Portions of Chapters 1 and 2 of Redesigning the

- Future. New York/London: Wiley, 1974. *Camillus, J.C.; "Strategy as a Wicked Problem," [Harvard Business Review](#), Vol. 86, 98-101 (2008)
- Conklin, Jeff; [Dialog Mapping: Reflections on an Industrial Strength Case Study](#), in Visualizing Argumentation - Tools for Collaborative and Educational Sense-Making, P. Kirschner, S.J.B Shum, C.S. Carr (Eds), Springer-Verlag, London (2003).
 - Conklin, Jeff; "Dialog Mapping: An Approach for Wicked Problems," CogNexus Institute, 2003b.
 - Conklin, Jeff; [Wicked Problems & Social Complexity](#), Chapter 1 of Dialog Mapping: Building Shared Understanding of Wicked Problems, Wiley, November 2005.
 - Conklin, Jeff, Min Basadur, and GK VanPatter; [Rethinking Wicked Problems: Unpacking Paradigms, Bridging Universes \(Part 1 of 2\)](#), NextDesign Leadership Institute Journal, 2007.
 - Conklin, Jeff, Min Basadur, and GK VanPatter; [Rethinking Wicked Problems: Unpacking Paradigms, Bridging Universes \(Part 2 of 2\)](#), NextDesign Leadership Institute Journal, 2007.
 - Conklin, Jeff; "Dialogue Mapping: Building Shared Understanding of Wicked Problems," Wiley; 1st edition, 18 November 2005, [ISBN 978-0-470-01768-5](#).
 - Courtney, J. F., "Decision Making and Knowledge Management in Inquiring Organisations, Decision Support Systems", Vol. 31, 17-38, (2008).
 - Horn, Robert E., and Robert P. Weber; ["New Tools For Resolving Wicked Problems: Mess Mapping and Resolution Mapping Processes"](#), Strategy Kinetics L.L.C., 2007
 - DeGrace, Peter, and L. Hulet Stahl (1990). *Wicked Problems, Righteous Solutions: A Catalog of Modern Engineering Paradigms*. Yourdon Press. [ISBN 0-13-590126-X](#).
 - Hulme, Mike, *Why We Disagree About Climate Change*, Cambridge University Press, 2009.
 - Kunz, W. and Rittel, H. W. J., "Issues as Elements of Information Systems", Working Paper No. 131, Studiengruppe für Systemforschung, Heidelberg (July 1970) (Reprinted, May 1979).
 - Lazarus, Richard James, [Super Wicked Problems and Climate Change: Restraining the Present to Liberate the Future](#). Cornell Law Review, Vol. 94, No. 5, 2009; Georgetown Public Law Research No. 1302623.
 - Levin, K.; B. Cashore, Steven Bernstein and G Auld (2009). ["Playing it forward: Path dependency, progressive incrementalism, and the "Super Wicked" problem of global climate change"](#). *IOP Conference Series: Earth and Environmental Science* 50 (6). [Bibcode 2009E&ES...6X2002L](#). [DOI:10.1088/1755-1307/6/50/502002](#).
 - Ritchey, Tom; [Wicked Problems: Structuring Social Messes with Morphological Analysis](#), Swedish Morphological Society, last revised 7 November 2007.
 - Rittel, H., "On the Planning Crisis: Systems Analysis of the 'First and Second Generations'," *Bedriftskonomen*, Vol. 8, 1972.
 - Rittel, H.W.J, "The Reasoning of Designers," Working Paper A-88-4, Institut für Grundlagen der Planung, Stuttgart (1988).
 - Rittel, Horst, and Melvin Webber; ["Dilemmas in a General Theory of Planning,"](#) pp. 155-169, *Policy Sciences*, Vol. 4, Elsevier Scientific Publishing Company, Inc., Amsterdam, 1973. [Reprinted in N. Cross (ed.), *Developments in Design Methodology*, J. Wiley & Sons, Chichester, 1984, pp. 135-144.]
 - Roberts, N.C. "Wicked Problems and Network Approaches to Resolution.," *The International Public Management Review.*, Vol. 1, 1 (2000).
 - Shum, Simon J. Buckingham, "The Roots of Computer Supported Argument Visualization", in Visualizing Argumentation - Tools for Collaborative and Educational Sense-Making, P. Kirschner, S.J.B Shum, C.S. Carr (Eds), [1], London (2003).
 - [Sølvberg](#), Arne and David Kung; "An Introduction to Information Systems Engineering," Springer-Verlag, 1993.
 - Stolterman, E., "The Nature of Design Practice and Implications for Interaction Design Research," *International Journal of Design*, Vol. 2, 55-65 (2008)

Further reading

- Australian Public Services Commission [Tackling Wicked Problems](#), 2007
- Brown, Valerie A. and Harris, John A. and Russell, Jacqueline Y; "Tackling wicked problems : through the transdisciplinary imagination" Edited by Valerie A. Brown, John A. Harris and Jacqueline Y. Russell [Earthscan](#) London ; Washington, DC : 2010. [ISBN 978-1-84407-925-4](#).
- Churchman, C. West, "Wicked Problems", [Management Science](#), Vol. 14, No. 4, December 1967. Guest Editorial
- Conklin, Jeff; [Building Shared Understanding of Wicked Problems](#), Rotman Magazine, the alumni magazine of [Rotman School of Management](#) (Winter 2009).
- Horn, Robert E., [Knowledge Mapping for Complex Social Messes](#), a [Stanford University](#) presentation to the "Foundations in the Knowledge Economy" conference at the [David and Lucile Packard Foundation](#), July 16, 2001
- Richardson, Adam; [Wicked Problems: Today's business problems can be impossible to define, let alone solve](#), Fall 2006

- Ritchey, T.: Wicked Problems - Social Messes: Decision support Modelling with Morphological Analysis. [Springer](#), 2011
- Rittel, Horst; "Second Generation Design Methods," Interview in Design Methods Group, 5th Anniversary Report, DMG Occasional Paper 1, 1972, pp. 5-10. Reprinted in N. Cross (ed.), Developments in Design Methodology, [John Wiley & Sons](#), Chichester, 1984, pp. 317-327.
- Shum, Simon J. Buckingham; Albert M. Selvin, Maarten Sierhuis, Jeffrey Conklin, Charles B. Haley, Bashar Nuseibeh; [Hypermedia Support for Argumentation-Based Rationale: 15 Years on from gIBIS and QOC](#), December 2005

External links

- [CogNexus Institute](#) - more information on wicked problems and dialogue mapping
- [Compendium](#) - software for Dialogue Mapping
- [CoPe_it!](#) - software for argumentative collaboration and decision support
- [Knowledge Media Institute](#)
- [Poppendieck L.L.C.](#) - wicked problems in software development
- [Debategraph](#) - [a creative commons tool for mapping wicked problems on the web](#)
- [Swedish Morphological Society](#) - Wicked Problems: Structuring Social Messes with Morphological Analysis

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