

Critical Systems Heuristics

Emily Gates^{a,@} and Raquel Muñiz^a

a: Boston College

@: emily.gates@bc.edu

Abstract

It is not possible to examine a situation or system of interest in its entirety or from all possible perspectives. Boundaries inevitably determine what is included and excluded, which can have practical, political, and ethical consequences. Critical systems heuristics (CSH) offers a framework of questions posed in descriptive (what is) and normative (what should be) modes that can inform boundary setting and re-setting in any inquiry, intervention, or evaluation. This paper first introduces CSH and an overview of early developments and influences. The next section highlights recent examples on the use of CSH from Colombia, South Africa, and New Zealand. The subsequent section identifies several open questions regarding CSH and its applicability. The paper concludes with reflections on future directions.

What is Critical Systems Heuristics (CSH)?

CSH comprises twelve questions that stakeholders can use to critically examine, discuss, and set boundaries in relation to a situation or system of interest. CSH is rooted in an orientation to research and practice that emphasizes critical selectivity practically carried out through boundary critique. To define CSH for this chapter, we begin with its critically-selective orientation and boundary critique process followed by examination of the heuristic, its twelve questions, modes of application, and early developments and influences.

Critically-Selective Orientation

Informed by critical social theory and practical philosophy, CSH has a critically-selective orientation. CSH challenges the systems fields' aspirational aims of holism and pluralism and social science's value-free assumptions; it assumes that social inquiry rests on value-laden boundary judgments regarding who/what is included. CSH is not about including everything or everyone, but rather critically considering who or what is (should be) excluded and justifying the normative bases for such choices. Ulrich and Reynolds [1] describe this selectivity and partiality as "(i) representing only a section rather than the whole of the total universe of relevant considerations, and (ii) serving some parties better than others" (p. 247). Selectivity and partiality condition a social inquiry or intervention and the claims professionals make, which has real-world consequences for different groups and interests. Therefore, social inquirers have a professional and moral responsibility to handle this selectivity and partiality critically.

Critical Selectivity in Bounding and Framing Situations of Interest

In contrast to other systems traditions, CSH distinguishes between a situation of interest and its framing. Situations of interest are real-world circumstances that people want to understand or change. Situations have continually changing influences, including multiple interconnected factors, multiple perspectives and values, and differences in power and control [2].

Framings are socially- and cognitively-constructed contexts, also called reference systems, people use to simplify situations, so they can practically understand, make claims about, and act in these situations. In framing, people make decisions about what facts and values they consider relevant to understand or act to change a situation. These decisions are called boundaries, because they conceptually bound or limit framing. Boundaries are the implicit or explicit assumptions, decisions, or judgments people make about what empirical and normative considerations are (not) relevant regarding a situation: who or what is included; excluded – ignored, overlooked, and invisible; and marginalized – neither fully included nor excluded [3]. Boundaries constitute and condition a framing. People can understand any situation of interest through multiple framings, depending on what boundaries they use based on which facts and values they consider relevant. Stakeholders, people or groups with a stake or interest in the situation, frame the situation differently, and, conversely, different framings identify different groups and interests as stakeholders. Examining multiple boundaries and framings offers a means for continually learning about a situation [1,4].

CSH views situations and framings as epistemological, relating to knowledge and knowing about the world – not ontological, regarding the nature of reality. Systems are framing devices, lenses through which someone understands, talks about, and intervenes in a situation. Systems as framings are epistemological and social constructs rather than ontological realities.

Boundary Critique Process

CSH uses a process called boundary critique, which consists of (a) identifying boundaries that influence or should influence a framing; (b) examining potential practical, political, and ethical consequences or issues; (c) considering alternative boundaries; and (d) making transparent and justifying the boundaries used, while remaining open to contestation and revision [5]. The process can be carried out in two modes: actual mapping to identify boundary judgments and ideal mapping to identify what boundary judgments should be [6,7]. Individuals and groups can carry out boundary critique differently. For example, researchers might carry out this process reflectively, to surface and consider the consequences of boundaries. Stakeholders might use boundary critique to question implicit boundaries, consider alternatives, and discuss potential consequences. Community members and citizens can use this process to challenge the boundaries professionals or researchers use [5].

Critical Systems Heuristics Questions (CSH-Q)

CSH Questions (CSH-Q) are 12 questions regarding various boundary judgments, displayed in Table 1. Reflecting, discussing, and answering the questions provides a way of bounding and framing a situation of interest. CSH-Q fall into four sources of influence on a framing, and each question identifies a

boundary judgment: basis of (1) motivation (e.g., where does a sense of purposefulness and value come from?), (2) control (e.g. who is in control of what is going on and is needed for success?), (3) knowledge (e.g., what experience and expertise support the claim?), and (4) legitimacy (e.g., where does legitimacy lie? [6]). The first three sources refer to who or what is involved in a situation and the fourth source refers to who or what is affected by the situation.

Relevant groups	Sources of influence	Boundary judgment	Questions
The involved	Motivation	Beneficiary	1. Who ought to be/is the intended beneficiary?
		Purpose	2. What ought to be/is the purpose?
		Measure of improvement	3. What ought to be/is the measure of success?
	Control	Decision maker	4. Who ought to be/is in control of the conditions of success?
		Resources	5. What conditions of success ought to be/are under the control of the decision makers?
		Decision environment	6. What conditions of success ought to be/are outside the control of the decision makers?
	Knowledge	Expert	7. Who ought to be/is providing relevant knowledge and skills?
		Expertise	8. What ought to be/are relevant knowledge and skills?
		Guarantor	9. What ought to be/are regarded as assurances of successful implementation?
The affected	Legitimacy	Witness	10. Who ought to be/is representing the interests of those negatively affected but not involved?
		Worldview	11. What ought to be/are the opportunities for the interests of those negatively affected to have expression and freedom from the dominant worldview?
		Emancipation	12. What space ought to be/is available for reconciling differing worldviews among those involved and affected?

Table 1. Critical Systems Heuristics Questions.

Ways to Apply CSH-Q

CSH-Q can be used in descriptive mode (‘what is’) to surface implicit ways of understanding and framing a situation and consider alternative descriptive framings or in normative mode (‘what should be’) to identify views on how things should be with regard to the situation of interest and consider alternative normative framings. Different individuals and groups can also use CSH-Q for various purposes and processes, including reflection, deliberation, and critique. CSH-Q facilitates a process by which the intended purposes and beneficiaries, decision-making structures, and knowledge and moral bases can be systematically examined from different perspectives [1].

Early Development of and Influences on CSH

This section overviews the substantial contributions of three systems thinkers – C. West Churchman, Werner Ulrich, and Gerald Midgley– to situate CSH within critical systems thinking and the systems fields.

Churchman contributed to multiple fields with an emphasis on considering ethical values in systems planning and analysis. In *The Systems Approach and Its Enemies*, Churchman [8] argued for the practical and ethical significance of boundary judgments and their implications. He critiqued the environmental fallacy, in which governments, policy makers, and program planners often ignore the wider environment when addressing social problems or systems. He challenged the idea that the way problems and systems are defined as ‘given’, empirically or logically, and that the ‘right’ boundaries for any system exist. Rather, he contended, “the question of the proper boundaries has no plausible, common-sense answer. The idea is not to find an answer but to foster the process of unfolding” ([8], p. 92). He argued that the process of ‘making whole system judgments’ (later called boundary judgments) is an ethical process, rather than a methodological or rational process. He saw ethics as an ongoing, dialectical process of “discussing and debating and occasionally fighting over the issues,” which includes acting ([8], p. 118).

Building on Churchman’s work, Werner Ulrich introduced the idea of boundary critique – questioning, debating, and justifying boundary judgments – and developed CSH-Q to guide this process, first presented in his 1983 book, *Critical Heuristics of Social Planning*. Ulrich [9] noted the impossibility of a comprehensive understanding of a social phenomenon and the inevitability of making some boundary judgments about what and whose perspectives are included/excluded. Boundary judgments “determine which empirical observations and value considerations count as relevant and which are left out or considered less important” ([6], p. 2). Any claims made about a situation rest on interrelated facts (‘observations’), values (‘evaluations’), and boundaries (‘systems’). Rather than informal approaches, Ulrich argues for systematically developing an understanding of what he calls the reference system, “sum-total of considerations of fact and values” (p. 2). Ulrich [10] advances CSH-Q and its underlying ideas of critically making and questioning boundary judgments as an essential civil competency and professional skill and responsibility.

Gerald Midgley, in his book *Systemic Intervention: Philosophy, Methodology, and Practice* [11] further developed the theory and practice of boundary critique and adapted CSH-Q for various applications. Midgley has applied systemic intervention in the arenas of social services [11], public health [12], and illicit drug policy [13], among others. Midgley [11] proposed that processes of marginalization lead to particular stakeholders and issues being neither fully included nor excluded in the system. Midgley [11] argues that processes of boundary critique should include critical reflection on what and who may be marginalized by particular boundary judgments, regardless of whether these issues are raised by stakeholders, in order to reduce further marginalization processes. Midgley [11] developed systemic intervention as a framework that integrates boundary critique with considerations of marginalization, theoretical and methodological pluralism, and acting for improvement.

CSH is also informed by its positioning within the critical systems thinking (CST) strand of the systems fields. Generally, CST is defined by three shared commitments: critical awareness, examining, and re-examining of underlying assumptions; orientation towards emancipation and/or improvement defined temporarily and locally; and methodological pluralism [14]. CST can be defined as having two strands: one encompassing CSH, which focuses on critical awareness and emancipation/improvement, and another on theoretical and methodological pluralism often associated with the work Flood and Jackson [15] on selecting systems methods for particular problem contexts [16]. Scholars within each strand hold differing views on and visions for CSH [7,17].

Case Applications of CSH-Q

CSH-Q has wide application across disciplines and areas of practice. In this section, we present two case applications including the use(s) for CSH-Q, challenges that arose, and perceived benefits.

Developing a Systemic Peace Education Program in Colombia

Researchers at a Colombian university, the Chamber of Commerce of Bogota (BCC), and local community members, including gang members and people living in poverty, came together in 2003 to create a peace education program [18]. The context, an ongoing violent civil war, made the region ripe for this project. The design team applied CSH widely throughout the 14-year intervention in a series of workshops.

The participants first used CSH-Q in ‘ought’ mode to debate and decide the general purpose of the program, choosing conflict resolution skills. CSH-Q also helped them explore the specific purpose, motivation, power, knowledge, and legitimacy of the program. After debate, they chose “transformation story” as the undergirding purpose – aiming for the transformation of the participants, their relationships, and communities.

They designed the first program using Ackoff’s idealized design methodology [19] and Checkland’s soft systems methodology stream of cultural analysis. As part of a critical approach, the participants reflected on the components of the program and developed four root definitions of the program, along with a conceptual model for each. They also compared their earlier CSH-Q responses to the models created and

made changes accordingly. In the next phases of the program – means planning, resource planning, design of implementation, and design control – the researchers used multiple methodologies. This work led to the adoption of the program in 10 schools.

The use of CSH in creating, implementing, and evaluating the program has proved beneficial. Orozco-Prieto [20] surveyed program alumni and non-alumni and found alumni appeared more comfortable dealing with conflict, and the program seemed to reduce violence within the communities involved [20]. The program has received international recognition, and as of 2018, 456 schools had adopted the program, involving more than 1 million people. The program has contributed to a culture of peace, transformation at a personal level, and strengthened social relations in hundreds of communities [18].

Family Violence Public Policy in New Zealand

Researchers at the Institute of Environmental Science and Research (ESR) [21], a government owned research institute, have been using CSH for nearly two decades to inform government public policy. At the core of their work are the four CSH inquiry areas, asking questions and making critical choices about what is included/excluded, who is (not) heard, and who influences or dominates decision-making in the conversations. They often involve multiple stakeholders, including government officials and grassroots practitioners.

An application of CSH comes from a project aimed at influencing government policy on family violence. The researchers used CSH in ‘is’ and ‘ought’ mode in two ways in the project. First, as a foundation, they engaged sector-experts who helped review the evidence base on family violence interventions. Second, they engaged both academics and practitioners in a series of workshops in which ESR researchers worked with participant perspectives on family violence and what constituted ‘the system.’ They did not impose pre-set boundaries or system definitions.

They used CSH as a tool to understand the qualities of a new system, however each participant defined the system. Legitimacy was key in these workshops in thinking about changes to how family violence might be tackled in New Zealand. The researchers asked questions using the language of transformation, including “What would a transformed system need to look like? What would make a transformed system credible to those for whom it matters? Who matters? What matters? What would you see as an improvement?” In addressing these questions, the researchers grappled with the multiple viewpoints and boundary complexities around family violence. The workshops included discussions on the numerous roles – the state, families, gender, sexuality – and drew participants from critical backgrounds, including from gender and power critique. The researchers believed the use of CSH helped the participants think about issues of legitimacy and credibility in relation to how evidence-based interventions could address family violence.

ESR’s philosophical view and approach to applying CSH is best summarized in their own words:

“There’s no absolute truth claim. . . . What there is, is perspective, and the whole point of critical systems thinking is to allow a critique of, and require some reflection or justification of truth

claims – because truth according to whom? . . . [T]he relevant facts are always intimately linked with the value judgments and the boundary judgments that they relate to . . . [In our work,] people came with self-evident truths – because they were committed and passionate to their solution to family violence – and they were confused about how the wider world was not being improved by a simple application of their self-evident truths. And what we did was we made life more complicated and complex for them, by putting them in a room with people who had different self-evident truths, and gave them a tool, CSH, to engage with “well, according to whom and for whose benefit? And what would be required for legitimacy?”

These questions illustrate the type of questions that ESR researchers and researchers across fields and practices continue to pose in their work in applying CSH-Q.

CSH Across Fields

CSH ideas have been broadly applied to various fields. We briefly explore applications of CSH in evaluation, child welfare and education policy, and public health. These developments are neither representative nor exhaustive of the breadth of fields using CSH but rather represent our training and familiarity with the scholarship.

CSH in Evaluation

In the last several decades, commissioners of evaluations and evaluators have expressed growing interest in systems and complexity thinking and science broadly [22–24] and in CSH specifically. Ulrich [25] argued for the relevance of Churchman’s process of unfolding boundaries to policy analysis and evaluation. Evaluators have since called attention to critical systems thinking for evaluation, including on the potential of CSH to critically address issues of equity in interventions and evaluations. Examples of this work include Reynolds’ and Williams’ [26] contribution to a UNICEF brief on *Evaluation for Equitable Development Results* that discusses using CSH-Q in service of evaluating equitability of a development project in India; Reynolds’ [27] examination of equity-focused developmental evaluation; Schwandt’s and Gates’ [28] examination of the use of boundary critique and CSH-Q to “push the practice of evaluation further into the domain of a normative undertaking that tackles the questions ‘are we doing the right things?’ and ‘what makes this the right thing to do?’ (p. 67); and Beer, Patrizi, and Coffman’s [29] advocacy for philanthropic foundations to use critical systems to interrogate assumptions underpinning strategies and subsequent evaluations from an equity lens. Additional work on CSH in evaluation includes a theoretical paper on the use of CSH to critically inform evaluative judgments about the value of social interventions [29]

CSH in Child Welfare and Higher Education Policy

The application of CSH in public policy arenas affecting primary and secondary school-aged children and students in postsecondary education remains in its infancy; the focus has remained on critical systems thinking broadly [30] and primarily outside the United States. Extant literature in these policy areas has called attention to the application of CSH both conceptually (see, e.g., [31] – applying CSH to create a

framework for developing privacy guidelines for foster youth; [32] – critically examining quality assurance systems in higher education, finding the systems serve external accountability purposes for government and outside agencies, not researchers and teachers) and empirically. For example, Ariyadasa and McIntyre-Mills [33] applied some CSH-Q to surface the social challenges related to the successful societal reintegration of institutionalized children in Sri Lanka. Algraini and McIntyre-Mills [34] similarly applied the 12 CSH-Q to critique education policy in Saudi Arabia, finding centralized education hampers opportunities for teachers and learners to contribute to shaping the curriculum and child development. A few studies in these policy areas have also concluded that CSH must be adapted to counter regional socio-political contexts, for example, Luckett's [35] application of CSH during the comment period of the policy making process for the development of quality assurance instruments for higher education in South Africa.

CSH in Public Health

Boundary critique and CSH-Q as a framework for questioning boundaries has been one systems approach among others (e.g. system dynamics and agent-based modeling) used in public health. Midgley [12] envisions how systemic intervention that incorporates boundary critique as a core initial process can be applied to health issues and, specifically, to addressing “disadvantage and social exclusion” (p. 467). In a foundational paper, “Hygeia’s Constellation: Navigating Health Futures in a Dynamic and Democratic World” produced at the U.S. Centers for Disease Control and Prevention, Milstein [36] employs, in pertinent part, the concept of boundaries to reorient public health to see “health protection as a whole system” (p.47). His subsequent work as Director of System Strategy at ReThink Health incorporates core ideas of CSH, other system concepts, and system dynamics modeling within a broader change process to “transform health and well-being through regional stewardship” [37]. See Gates and Fils-Aime [38] for case study on how ReThink Health influences and evaluates its systemic change efforts.

Open Questions Regarding CSH and Its Applicability

Across disciplines and practices, questions remain open about how, why, and with what consequences CSH is and ought to be used. We discuss several of these to stimulate reflection.

Is CSH applicable across every context?

Scholars have argued that “making up front boundary judgments cannot be ignored in any research situation” ([39], p. 20) and that “boundary critique needs to be conducted up-front in any intervention or evaluation” ([40], p. 1309). CSH, some argue, is particularly suited to coercive contexts [41]. However, others question the applicability of CSH to coercive problem-contexts [17,42]. More recently, some researchers applying CSH have questioned whether CSH requires openness to dialogue such that some situations with considerable conflict and power differentials limit its applicability. For example, Luckett's [35] work in South Africa concluded that the historical and socio-political fractures in the region and the region's status as a new democracy with a weak public sphere constrained CSH from countering the power differentials across social roles.

Is CSH bound by any paradigm?

Some scholars have argued that one's understanding of boundaries and boundary critique depend on the philosophical or theoretical paradigm used in the study: "[E]ven the concept of 'system' means different things depending upon the paradigm of thought that it is serving. This is even more the case with 'boundary' and 'boundary critique'. There are therefore various forms of boundary critique (all valuable) depending on methodology choice" ([17,42], p. 1226).

Churchman [8], Ulrich [9], and Midgley [11] did not see boundary critique as bound by any paradigm. Rather, Ulrich [10] argued that CSH is not a matter of methodology choice to be used in particular contexts. He founded CSH in critically systemic discourse, which he defines as including argumentative, discursive reason; civil society; emancipatory orientation; systemic boundary critique; and deep complementarism (p. 339). Jackson [17] critiqued Ulrich for taking a "narrow, isolationist theoretical base" and, instead, views CSH as one theoretical and methodological perspective on boundary critique amongst other CST approaches (p. 1226).

How can CSH be used to challenge or justify the validity of professional claims?

Ulrich [43] raises the issue regarding the potential use of CSH by citizens to challenge the validity of professional claims. This work closely relates to Ulrich's [44] concept of systemic triangulation. In social research, triangulation generally refers to the bringing together of multiple perspectives and data sources to converge in support of a particular inference. Systemic triangulation in CSH refers to the critical consideration of the interrelationship between a set of facts or evidence, values or norms, and boundary judgments in relation to a claim [44]. In Ulrich's [43,44] work on "systems thinking as if people mattered" he questions how knowledge can be democratized; one strategy is for citizens to use CSH to challenge the validity of knowledge claims. However, the question remains as to how CSH can be employed in such a manner to challenge the validity of professional knowledge claims.

Concluding Thoughts and Future Directions

With its philosophical depth and practical breadth, CSH is a systems approach that ought to be a part of any systems repertoire. Drawing boundaries when conducting a social inquiry, intervention or evaluation is inevitable, but doing so responsibly with careful consideration of alternative boundaries and potential consequences is not. Furthermore, identifying which boundaries to critique in relation to a situation or system of interest is not readily apparent. CSH offers guidance in these endeavors.

Based on our partial review of CSH and select applications, we foresee five potential directions. First, those who have extensively applied CSH-Q in practice possess rich experiential knowledge they can share. Sharing may involve developing a database of adaptations of each boundary question so that those interested in translating across languages and adapting across practices and stakeholder groups can access question variations. These practitioners can also write up case applications and conduct cross-case analyses to distill and share lessons learned.

Second, given the need for further research that connects the theory and practice of CSH with social science research, we foresee fertile areas for potential growth. For example, research might specifically connect the concepts of systemic triangulation and validity with CSH to better integrate the concepts of boundary judgments within more traditional social science research.

Third, we foresee the need for further empirical research to examine the purposes and processes through which multiple stakeholders use CSH-Q and to understand its utility and value in practice. One area for research could examine the research questions and designs within which CSH-Q is employed. This may also simultaneously help address the question of how CSH-Q can be combined with other methodologies.

Fourth, we foresee applications of CSH into a wider set of fields and practices. CSH may be useful for grassroots, bottom-up policy-making, in areas such as U.S. public education – for example, drawing together education stakeholders to debate boundaries to develop education policies. Another potential area is the legal system, which critical legal theorists have argued is far from objective and favors the powerful. One way CSH can help bring these voices to the forefront is, for example, arbitrators and courts adapting CSH-Q to incorporate the voices of those traditionally not included in their legal analyses (see, e.g., [45] – examining the lack of attention to children’s needs and voices in arbitration court cases and [46] – studying how courts create and uphold racialized boundaries in equal protection anti-discrimination law).

Fifth, the connection between CSH and democratic ideals could be further developed to examine the ways in which CSH can inform civic engagement, democratic deliberation, and the pursuit of social equity. This could draw on Ulrich’s theoretical writings but focus on the refinement of the CSH-Q approach to practically facilitate democratic aims.

References

1. Ulrich W, Reynolds M. Critical Systems Heuristics. In: Reynolds M, Holwell S, editors. *Systems Approaches to Managing Change: A Practical Guide*. London: Springer London; 2010. pp. 243–292. doi:10.1007/978-1-84882-809-4_6
2. Reynolds M. (Breaking) the iron triangle of evaluation. *IDS Bull.* 2015;46: 71–86. doi:10.1111/1759-5436.12122
3. Midgley G. The Sacred and Profane in Critical Systems Thinking. *Systems Thinking in Europe*. 1992. pp. 397–405. doi:10.1007/978-1-4615-3748-9_55
4. Reynolds M. Evaluation and stakeholding development. oro.open.ac.uk; 2010. p. 16. Available: <http://oro.open.ac.uk/26778/>
5. Ulrich W. Boundary critique. In: Daellenbach HG, Flood RL, editors. *The informed student guide to management science*. 2002.
6. Ulrich W. Critical systems heuristics. In: Daellenbach HG, Flood RL, editors. *The informed student guide to management science*. 2002.
7. Ulrich W. A brief introduction to critical systems heuristics (CSH). *Ecosensus*. 2005.
8. Churchman CW. *The systems approach and its enemies*. Basic Books; 1979.
9. Ulrich W. *Critical heuristics of social planning: A new approach to practical philosophy*. 1983.
10. Ulrich W. A brief introduction to critical systems thinking for professionals and citizens. *Werner Ulrich's Home Page*. 2003; 1–11.
11. Midgley G. *Systemic Intervention: Philosophy, Methodology, and Practice*. Springer, Boston, MA; 2000. doi:10.1007/978-1-4615-4201-8
12. Midgley G. Systemic Intervention for Public Health. *American Journal of Public Health*. 2006. pp. 466–472. doi:10.2105/ajph.2005.067660
13. Midgley G, Winstanley A, Gregory W, Foote J. Monograph 13: Scoping the Potential Uses of Systems Thinking in Developing Policy on Illicit Drugs. DPMP Monograph Series Fitzroy: Turning Point Alcohol and Drug Centre. 2005.
14. Midgley G. The Ideal of Unity and the Practice of Pluralism in Systems Science. In: Flood RL, Romm NRA, editors. *Critical Systems Thinking: Current Research and Practice*. Boston, MA: Springer US; 1996. pp. 25–36. doi:10.1007/978-0-585-34651-9_2
15. Flood RL, Jackson MC. Total systems intervention: A practical face to critical systems thinking. *Systems Practice*. 1991. pp. 197–213. doi:10.1007/bf01059565
16. Ulrich W. CST's two ways: a concise account of critical systems thinking. *Ulrich's Bimonthly*. 2012;10: 1–24. Available: https://www.wulrich.com/bimonthly_november2012.html
17. Jackson MC. Deeper complementarism: a brief response to Ulrich. *Journal of the Operational Research Society*. 2003. pp. 1225–1226. doi:10.1057/palgrave.jors.2601630

18. Pinzon-Salcedo LA, Torres-Cuello MA. Community Operational Research: Developing a systemic peace education programme involving urban and rural communities in Colombia. *European Journal of Operational Research*. 2018. pp. 946–959. doi:10.1016/j.ejor.2017.11.040
19. Ackoff R. Idealized design: Creative corporate visioning. *Omega*. 1993. pp. 401–410. doi:10.1016/0305-0483(93)90073-t
20. Orozco-Prieto FE. Evaluación del programa para la gestión del conflicto escolar (Hermes) de la Cámara de Comercio de Bogotá. UNIANDES. 2009.
21. ESR. About ESR. 2019.
22. Cabrera D, Cabrera L, Lobdell C. Systems Thinking. *Journal of Evaluation and Program Planning*. 2008;31: 299–310.
23. Reynolds M, Forss K, Hummelbrunner R, Marra M, Perrin B. Complexity, systems thinking and evaluation-an emerging relationship? *Evaluation Connections: Newsletter of the European Evaluation Society*. 2012; 7–9. Available: <http://oro.open.ac.uk/36333/7/Connections%20Complexity%20FINAL.pdf>
24. Gates EF, Walton M, Vidueira P, McNall M. Introducing systems- and complexity-informed evaluation. *New Dir Eval*. 2021;2021: 13–25. doi:10.1002/ev.20466
25. Ulrich W. Churchman’s “process of unfolding” and its significance for policy analysis and evaluation. *Systems Practice*. 1988. pp. 415–428. doi:10.1007/bf01066583
26. Reynolds M, Gates E, Hummelbrunner R, Marra M, Williams B. Towards Systemic Evaluation. *Syst Res*. 2016;33: 662–673. doi:10.1002/sres.2423
27. Reynolds M. Equity-focused developmental evaluation using critical systems thinking. *Evaluation*. 2014. pp. 75–95. doi:10.1177/1356389013516054
28. Schwandt TA, Gates E. What can evaluation do? An agenda for evaluation in service of an equitable society. *Evaluation for an equitable society*. 2016; 67–81.
29. Beer T, Patrizi P, Coffman J. Holding Foundations Accountable for Equity Commitments. *The Foundation Review*. 2021;13: 9. doi:10.9707/1944-5660.1565
30. Davis AP, Dent EB, Wharff DM. A Conceptual Model of Systems Thinking Leadership in Community Colleges. *Systemic Practice and Action Research*. 2015. pp. 333–353. doi:10.1007/s11213-015-9340-9
31. Fitch D. Youth in Foster Care and Social Media: A Framework for Developing Privacy Guidelines. *Journal of Technology in Human Services*. 2012. pp. 94–108. doi:10.1080/15228835.2012.700854
32. Houston D, Paewai S. Knowledge, power and meanings shaping quality assurance in higher education: a systemic critique. *Quality in Higher Education*. 2013. pp. 261–282. doi:10.1080/13538322.2013.849786
33. Ariyadasa E, McIntyre-Mills J. A Systemic Governance Approach to an Effective Re-integration Process for the Institutionalized Children in Sri Lanka: Application of Critical Systems Heuristics. *Systemic Practice and Action Research*. 2015. pp. 429–451. doi:10.1007/s11213-014-9338-8

34. Algraini S, McIntyre-Mills J. Human Development in Saudi Education: a Critical Systemic Approach. *Systemic Practice and Action Research*. 2018. pp. 121–157. doi:10.1007/s11213-017-9432-9
35. Luckett K. An Assessment of the Application of “Critical Systems Heuristics” to a Policy Development Process. *Systemic Practice and Action Research*. 2006. pp. 503–521. doi:10.1007/s11213-006-9040-6
36. Milstein B. Hygeia’s Constellation Navigating Health Futures in a Dynamic and Democratic World. 2007.
37. ReThink Health. Our approach. [Website]. 2019.
38. Gates EF, Fils-Aime F. System change evaluation: Insights from The Rippel Foundation and its ReThink Health initiative. *New Dir Eval*. 2021;2021: 125–138. doi:10.1002/ev.20462
39. Midgley G. Evaluating Services for People with Disabilities. *Evaluation*. 1996. pp. 67–84. doi:10.1177/135638909600200106
40. Boyd A, Geerling T, Gregory WJ, Kagan C, Midgley G, Murray P, et al. Systemic evaluation: a participative, multi-method approach. *Journal of the Operational Research Society*. 2007. pp. 1306–1320. doi:10.1057/palgrave.jors.2602281
41. Midgley G. Dealing with coercion: Critical Systems Heuristics and beyond. *Systems Practice*. 1997. pp. 37–57. doi:10.1007/bf02557850
42. Jackson MC, Keys P. Towards a System of Systems Methodologies. *J Oper Res Soc*. 1984;35: 473–486. doi:10.1057/jors.1984.101
43. Ulrich W. Critical Systems Thinking for Citizens. In: Flood RL, Romm NRA, editors. *Critical Systems Thinking: Current Research and Practice*. Boston, MA: Springer US; 1996. pp. 165–178. doi:10.1007/978-0-585-34651-9_9
44. Ulrich W. Systems thinking as if people mattered. Part 1: A plea for boundary critique. *Ulrich’s Bimonthly*. 2017.
45. Muñiz R. You Are Now Entering the School Zone, Proceed with Caution: Educators, Arbitration, & Children’s Rights. 2017.
46. Wright DK, Muñiz R, Keffer S. The walking dead: how the logic of Plessy v. Ferguson is preserved in equal protection law in the 21st Century. *Int J Qual Stud Educ*. : 1–19. doi:10.1080/09518398.2023.2181431