Cadernos Ibero-Americanos de Direito Sanitário
Cuadernos Iberoamericanos de Derecho Sanitario
ISSN: 2358-1824

Article

Application of Charles Edward Lindblom's incrementalist theory to emerging technologies in law and health education

Aplicação da teoria incrementalista de Charles Edward Lindblom às tecnologias emergentes na formação em direito e saúde

Application of Charles Edward Lindblom's incrementalist theory to emerging technologies in law and health education

Andressa Felix Lisboa[1]
Universidade Santa Cecília, Santos, SP.
https://orcid.org/0009-0001-0585-4828
felix@lamyeoliveira.adv.br

Danilo de Oliveira[2]
Universidade Santa Cecília, Santos, SP.
https://orcid.org/0000-0003-4099-3716
oliveira@lamyeoliveira.adv.br

Marcelo Lamy[3]
Universidade Santa Cecília, Santos, SP.
https://orcid.org/0000-0001-8519-2280
lamy@lamyeoliveira.adv.br

Submitted on: 03/09/25
Revision on: 09/29/25
Approved on: 10/06/25

Abstract

Objective: to analyze Charles Edward Lindblom's theory of incrementalism in order to discuss its potential for decision-making in health policy. **Methodology:** The research used a qualitative methodology based on a literature review, comparing the incremental model with the comprehensive rational model. **Results:** The results indicate that small successive changes favor the adaptability of the legal and regulatory system, allowing for continuous adjustments without compromising fundamental rights or restricting technological advances. **Conclusion:** The incremental approach proves essential for balancing innovation and safety, ensuring greater effectiveness in protecting public health and regulating new technologies.
Keywords: Health Policy; Health Technology Assessment; Right to Health; Public Policy.

Resumo

Objetivo: analisar a teoria do incrementalismo de Charles Edward Lindblom, a fim de discutir seu potencial para a tomada de decisão em políticas de saúde. **Metodologia:** A pesquisa utilizou metodologia qualitativa baseada em revisão bibliográfica, comparando o modelo incremental com o racional compreensivo. **Resultados:** os resultados indicam que pequenas mudanças sucessivas favorecem a adaptabilidade do sistema jurídico e regulatório, permitindo ajustes contínuos sem

[1] LLM in Law, Universidade Santa Cecília, Santos, SP, Brazil.
[2] Ph.D in Law, Pontifícia Universidade Católica de São Paulo, São Paulo, SP, Brazil. Professor, Universidade Santa Cecília, Santos, SP, Brazil.
[3] Ph.D in Constitutional Law, Pontifícia Universidade Católica de São Paulo, São Paulo, SP, Brazil. Professor, Santa Cecília Universidade Santa Cecília, SP, Brazil.

comprometer direitos fundamentais ou restringir avanços tecnológicos. **Conclusão:** a abordagem incremental se mostra essencial para equilibrar inovação e segurança, garantindo maior efetividade na proteção da saúde pública e na regulamentação das novas tecnologias.
Palavras-chave: Política de Saúde; Avaliação das Tecnologias de Saúde; Direito à Saúde; Política Pública.

Resumen

Objetivo: analizar la teoría del incrementalismo de Charles Edward Lindblom con el fin de discutir su potencial para la toma de decisiones en las políticas de salud. **Metodología:** la investigación utilizó una metodología cualitativa basada en la revisión bibliográfica, comparando el modelo incremental con el modelo racional comprensivo. **Resultados:** los resultados indican que los pequeños cambios sucesivos favorecen la adaptabilidad del sistema jurídico y regulatorio, permitiendo ajustes continuos sin comprometer los derechos fundamentales ni restringir los avances tecnológicos. **Conclusión:** el enfoque incremental resulta esencial para equilibrar la innovación y la seguridad, garantizando una mayor efectividad en la protección de la salud pública y en la regulación de las nuevas tecnologías.
Palabras clave: Política de Salud; Evaluación de Tecnologías Sanitarias; Derecho a la Salud; Política Pública.

Introduction

In 1959, Charles E. Lindblom developed the theory of incrementalism[1], which he revised in 1979[2], as a counterpoint to the traditional method of public policy formulation, the comprehensive rational model.

According to Lindblom, policy formulation should ideally be based on the identification/exhaustive analysis of all possible alternatives, leading to the optimal solution[1]. However, the author describes that, in practice, such an approach is unfeasible due to the complexity of the problems, the lack of complete information, and the time and resource constraints faced by decision makers[1].

In this context, Lindblom proposes the method of successive limited comparisons, also known as incrementalism, which suggests that public policies be formulated and adjusted through small incremental steps, rather than through major structural reforms[1].

Policy makers do not need to seek a final solution, but rather implement gradual changes based on practical experimentation and feedback from past experiences. Thus, decisions can be continuously adjusted as new information or contexts arise.

The incremental approach recognizes uncertainty and the need for flexibility in the policy-making process, allowing adjustments to be made in real time as policies are tested and adapted to circumstances[1].

This study investigates the application of Lindblom's theory of incrementalism in the regulation and integration of emerging technologies in legal and health education, with an emphasis on health law.

The central hypothesis is that the incrementalist approach favors the continuous adaptation of legal and regulatory systems, allowing for the gradual incorporation of technological innovations without compromising fundamental rights or generating regulatory uncertainty. This perspective contrasts with rigid and structural approaches, which can hinder the response to rapid changes in the technological field.

The expected results suggest that the adoption of incrementalism can contribute to the harmonization between innovation and legal certainty, allowing for a more dynamic regulatory model that is responsive to technological transformations. It is also expected that the comparative analysis between the theoretical models will provide insights to improve the formulation of public policies aimed at integrating emerging technologies in the fields of law and health.

Methodology

To investigate the application of incrementalism in the regulation and integration of emerging technologies in law and health education, this study is characterized as a theoretical-conceptual research, of an exploratory-descriptive nature, whose objective is to analyze Charles Edward Lindblom's incrementalist theory and discuss its potential application in the regulation and integration of emerging technologies in law and health education. To this end, a critical-narrative review was conducted of the works "The Science of 'Muddling Through" and "Still muddling, not yet through," covering classic and recent doctrinal works on public policy, incrementalism, and emerging technologies, as well as national and international scientific articles relevant to the topic. The analysis was conducted from a dialogical perspective, comparing the ideas in the literature consulted with interpretations and reflections developed by the authors of this study, in order to assess the relevance and limits of incrementalism as a reference for the legal-health field[3].

The Science of 'Muddling Through

Charles Edward Lindblom was a renowned American political scientist and economist whose contributions to public administration theory and public policy analysis are widely recognized.

Born in 1917 and deceased in 2018, Lindblom was a professor at Yale University, where he spent most of his academic career. His work focused on public policy formulation and decision-making processes, standing out for challenging traditional approaches and promoting more practical and realistic methods.

In the 1950s, when Lindblom developed many of his ideas, the United States faced complex political and social challenges. It was a time marked by the Cold War, the expansion of the federal government, and a growing recognition of the need for effective public policies to address social and economic problems.

Against this backdrop, Lindblom wrote "The Science of 'Muddling Through," a work that reflects his observations on the limitations of traditional policy-making methods and the need for more adaptive and incremental approaches[1].

Thus, Lindblom addresses the complexities inherent in public policy formulation. He compares two methods of decision-making: the comprehensive rational method (Root)[1] and the method of successive limited comparisons (Branch)[1].

While the comprehensive rational method represents a theoretical ideal, the method of successive limited comparisons is more representative of the realistic practice adopted by public policymakers[1].

The comprehensive rational method is described as an idealized process involving the clear definition of values and objectives prior to any empirical analysis, where all relevant values and objectives are identified and prioritized. This supposedly facilitates the formulation of policies that

maximize the achievement of these objectives. There is a clear distinction between the ends to be achieved and the means to achieve them[4].

The analysis of the means is done only after the ends have been defined. All possible alternatives are considered and compared in terms of their ability to achieve the defined ends. This requires a thorough and detailed analysis of each alternative. Policy formulation is guided by comprehensive theories that explain the relationships between different variables and expected outcomes[4].

However, Lindblom points out that this method, although ideal, is impractical due to human cognitive limitations, insufficient information and resources, and the complexity of the problems faced in public policy formulation[1].

Contrasting the comprehensive rational method, Lindblom proposes the method of successive limited comparisons, characterized by the interconnection between values and policies, rather than clearly separating values from means, both of which are chosen interdependently.

Policymakers simultaneously adjust their values and policies based on successive and incremental comparisons. Only a limited number of alternatives and factors are considered. Decisions are based on small incremental adjustments to previous policies, rather than radical changes or exhaustive analysis. The method relies more on practical experimentation and past experience than on comprehensive theories. The emphasis is on "getting out of step" through incremental and practical adjustments.

Lindblom compares the two methods in detail to illustrate their fundamental differences and practical implications. In the comprehensive rational method (Root), there is clarity of values with defined objectives prior to the analysis of means, separation of means and ends with a distinction between objectives and means, thorough analysis with consideration of all possible alternatives, and a strong theoretical basis with reliance on comprehensive theories. In the limited comparisons method (Branch), there is interconnection of values and policies with simultaneous choices of values and policies, limited and incremental analysis with consideration of a limited number of alternatives, and reduced theoretical dependence with an emphasis on practical and incremental adjustments[1].

Lindblom argues that, in practice, policymakers use the limited comparisons method because of its adaptability and realism. He points out that public administrators face challenges such as diversity of values, disagreement over objectives, and the uncertainty inherent in complex decisions. In such contexts, the comprehensive rational method becomes impractical. Instead, policymakers make incremental choices based on specific circumstances and learning from past experiences. This process allows for continuous and incremental adjustments, which facilitates navigation amid complexity and uncertainty[1].

Lindblom concludes that the method of successive limited comparisons, although less theoretical and more pragmatic, is essential for effective policy-making. He stresses the importance of recognizing and formalizing this approach in public administration and policy studies. The incremental approach offers several practical advantages: adaptability, allowing for continuous adjustments and rapid responses to new information and circumstances; feasibility, reducing the need for exhaustive analysis and comprehensive theories, making the process more manageable and realistic; and effectiveness, focusing on small improvements and incremental adjustments, avoiding the risks and costs associated with radical changes.

Still muddling, not yet through

Years later, in the 1970s, specifically in 1979, Charles Edward Lindblom revisited his original ideas in a new work entitled "Still muddling, not yet through." In this text, he continues to explore the viability of the method of successive limited comparisons and offers a critical reflection on how this approach has been interpreted and applied over the years[2].

The context for this new approach is the 1970s, a period of major political and social change in the United States and around the world. The political landscape was becoming increasingly complex, with the intensification of problems such as inflation, the oil crisis, and rising international tensions. Public administration faced new challenges, requiring more flexible and adaptive approaches to to policy-making.

Lindblom discusses the criticism his initial method received and provides additional clarification, reaffirming the importance of the incremental approach in public policy formulation. He addresses new emerging issues and challenges in public administration, offering *insights* into how incremental theory can be adapted to address these new realities. Lindblom acknowledges the limitations of his method but argues that, despite these limitations, the incremental approach remains a valuable tool for policymakers operating in complex and uncertain contexts.

It is noted that in response to criticism that his approach was inherently conservative, Lindblom reevaluated his theory, evolving it from the concept of "muddling through" to that of disjointed incrementalism. In this more sophisticated view, policy formulation is understood as a fragmented process, conducted by multiple actors with imperfect coordination, whose main decision-making mechanism is partisan mutual adjustment, a dynamic of negotiation and political bargaining. He clarified that "increment" refers to any change from the status quo, not necessarily a minor change, and recognized the occasional need for more comprehensive analyses to overcome political "pitfalls," reaffirming incrementalism not as a normative ideal, but as the most accurate description of the decision-making process in complex and pluralistic democracies[5].

Incrementalism and the Challenges of Health Law in the Digital Age

The application of Lindblom's theory of incrementalism offers a pragmatic lens for analyzing the current challenges of health law, especially in the regulation of emerging technologies in the Unified Health System (SUS).

Emerging health technologies are innovations that are in the early stages of development or adoption but have significant disruptive potential to transform the diagnosis, treatment, and management of health services. Notable examples include Artificial Intelligence (AI) for diagnostic imaging and personalized treatment, Telemedicine, wearable devices for remote monitoring, and advances in Genomics and 3D Printing. These advances promise not only improvements in clinical outcomes and more personalized experiences for patients, but also cost optimization and expanded access to healthcare, reducing the need for invasive and expensive tests[6].

For the SUS, the incorporation of these emerging technologies represents a strategic opportunity to address chronic challenges such as unequal access, high demand for services, and the pressing need for operational efficiency.

The regulatory response to this dynamic is already aligned, in a way, with the theory of incrementalism itself[1]. The National Policy for Health Technology Management (PNGTS), an essential pillar for regulatory discussion, reflects a gradual and cautious approach. It is no

coincidence that the PNGTS provides, in its Article 1, that the policy will be implemented gradually and coordinated across the three levels of SUS management[7]. This legal provision demonstrates the intrinsic recognition that the management and regulation of complex innovations require a process of continuous and limited adaptation, rather than immediate radical reform[7].

Tools such as telemedicine and the use of AI in queue management or early diagnosis, for example, can democratize access to specialists in remote areas and free up resources by optimizing processes (such as scheduling and triage), reducing costs and waiting times. The Digital Health Strategy for Brazil aims precisely to take advantage of these resources, such as electronic patient records and big data analysis, to transform the traditional model of care[8].

However, the rapid evolution of these innovations requires an equally agile and robust regulatory response. The need for regulation is critical to ensure safety, effectiveness, and equity in the application of these tools, especially in the public and universal context of the SUS. Ethical issues, such as bias in AI algorithms that can perpetuate inequalities or the protection of sensitive data (LGPD)[9] require clear guidelines. The regulatory challenge, therefore, is not only to technically validate the product (role of the National Health Surveillance Agency - Anvisa), but mainly to ensure rigorous Health Technology Assessment (HTA) for its ethical and economically sustainable incorporation into the SUS, ensuring that innovations benefit the entire population. It is in this scenario of complexity and uncertainty that the incremental approach to public policy becomes relevant.

It can be observed that, instead of seeking large and risky regulatory reforms that attempt to predict all future scenarios, the incremental approach offers the possibility that the integration of innovations[1], such as Artificial Intelligence (AI) for diagnostics or the use of big data for epidemiological surveillance, can be done in a progressive and adjustable manner. Thus, public management and regulatory agencies, such as the Brazilian Health Regulatory Agency (Anvisa), could learn from experience and continuously adapt standards, balancing innovation and safety.

Thus, this incremental perspective is supported by the right to development, which, in the context of health, requires that technological progress strengthen universal and equitable access to health[10]. The core of this requirement lies in its basic principles: active participation in the development process, equitable distribution of benefits, and non-discrimination. In other words, the incorporation of new technologies into the SUS cannot, under any circumstances, deepen inequalities.

Therefore, a gradual implementation model (both for technology and regulation) is essential to monitor the impacts on the system's equity, ensuring that digitization serves to include, rather than exclude, vulnerable populations from access to quality services[10].

In this sense, the European Union's regulatory model for AI, which establishes risk categories, provides a practical roadmap for health law[11]. The European Artificial Intelligence Regulation (AI Act), formally approved in May 2024, establishes the world's first comprehensive legal framework for AI, with the aim of balancing technological progress with the protection of citizens' fundamental rights. The central legal architecture of the AI Act is based on a risk-based approach, categorizing AI systems into four levels to determine the strictness of compliance obligations[11].

The AI Act provides for a hierarchy of risks. At the bottom are Minimum Risk systems, such as spam filters or video games, which can be used without specific restrictions. Above that, Limited Risk applies to chatbots and deepfakes, requiring transparency obligations so that the user knows

they are interacting with an AI. The third level, High Risk, includes systems that can affect health, safety, or fundamental rights, such as those used in medical diagnostics, patient screening, transportation, or recruitment, and requires a strict set of requirements before being placed on the market. At the top of the inverted pyramid is Unacceptable Risk, which covers practices that threaten human dignity, such as social scoring or cognitive-behavioral manipulation, and are therefore completely prohibited in the European Union[11].

When classifying the risk of a new technology, such as a patient screening algorithm, SUS managers can adopt flexible policies in line with Lindblom's thinking: low-risk technologies can be implemented more quickly, while high-risk ones require controlled pilot projects and rigorous evaluations before large-scale adoption. This approach avoids both regulatory paralysis, which hinders innovation, and irresponsible adoption, which may violate patients' fundamental rights[11].

Thus, the regulation of emerging technologies in health law is essentially an adaptive process. Lindblom's theory, combined with the principles of the right to development and risk mitigation models, underpins a public policy that fosters responsible innovation. The ultimate goal would be to ensure that technological advances in the SUS not only modernize management and care but, above all, reinforce the pillars of universality, equity, and social justice that structure the right to health in Brazil.

Final Considerations

A comparative analysis of Lindblom's two texts — "The Science of Muddling Through" and "Still muddling, not yet through"—reveals an evolution and deepening of his ideas on incrementalism. While maintaining the essence of his initial theory, Lindblom acknowledges the criticisms and adjusts his proposals to better respond to the complexities of modern policy-making.

Although developed more than half a century ago, it can be directly applied to the challenges faced today with emerging technologies, especially in the field of health law.

The rapid evolution of technologies (artificial intelligence/big data) brings significant uncertainties for regulators and health professionals, as well as complex ethical and legal issues. The emerging technology landscape is characterized by rapid and unpredictable transformations, making it impossible to predict all of its long-term implications.

Thus, the application of Lindblom's theory suggests that it is more effective to adopt an incremental approach to integrate and regulate these innovations.

Regulatory authorities should start with basic standards and guidelines that can be adjusted as technology evolves. By adopting flexible guidelines and closely monitoring their consequences, regulators could gradually adapt policies as new challenges arise. This would allow the legal system to keep pace with technological developments without compromising fundamental rights, such as the right to health or patient safety.

Therefore, when applying Lindblom's theory to emerging technologies in law and health, we see the importance of progressive adaptation that allows for continuous adjustments. Without limiting technological innovations through major immediate reforms, an incremental approach would allow regulations, educational practices, and health policies to progressively adjust to emerging demands, bringing effectiveness to the legal system that protects health.

Conflict of interest
The authors declare that there is no conflict of interest.

Funding
This study was conducted with support from the Coordination for the Improvement of Higher Education Personnel – Brazil (CAPES) – Funding Code 001.

Contribution of the authors
Lisboa AF contributed to data analysis and interpretation, writing the article, critically reviewing its content, and approving the final version. De Oliveira contributed to data analysis and interpretation, writing the article, critically reviewing its content, and approving the final version. Lamy M contributed to data analysis and interpretation, writing the article, critically reviewing its content, and approving the final version.

Editorial team
Scientific editor: Alves SMC
Assistant editors: Cunha JRA, Lemos ANLE
Associate editors: Lamy M, Ramos E
Executive editor: Teles G
Editorial assistants: Mendes DSGJ, Rocha DSS, Rodrigues MESN
Proofreader: Barcelos M
Tranlation: Câmara DEC

References
1. Lindblom CE. The science of muddling through. In: Classic readings in urban planning. Abingdon: Routledge; 2018. p. 31–40.

2. Lindblom CE. Still muddling, not yet through. Public Adm Rev. 1979;39(6):517-26.

3. Lamy M. Metodologia da pesquisa: técnicas de investigação, argumentação e redação. 2ª ed. rev. atual. e ampl. São Paulo: Matrioska Editora; 2020. p. 337-40.

4. Lindblom CE. O processo de decisão política. Brasília: Editora UnB; 1981 [cited Jan. 22, 2025].

5. Braybrooke D, Lindblom CE. A strategy of decision: policy evaluation as a social process. New York: Free Press; 1963.

6. Brasil. Ministério da Saúde. Secretaria-Executiva. Departamento de Informática do SUS. Estratégia de saúde digital para o Brasil 2020–2028 [Internet]. Brasília: Ministério da Saúde; 2020 [cited Out. 6, 2025]. 128 p. Available from: http://bvsms.saude.gov.br/bvs/publicacoes/estrategia_saude_digital_Brasil.pdf

7. Brasil. Ministério da Saúde. Portaria nº 2.690, de 5 de novembro de 2009. Institui, no âmbito do Sistema Único de Saúde (SUS), a Política Nacional de Gestão de Tecnologias em Saúde [Internet]. Brasília: Ministério da Saúde; 2009 [cited Out. 6, 2025]. Available from: https://bvsms.saude.gov.br/bvs/saudelegis/gm/2009/prt2690_05_11_2009.html

8. Brasil. Ministério da Saúde. Secretaria-Executiva. Departamento de Informática do SUS. Estratégia de saúde digital para o Brasil 2020–2028 [Internet]. Brasília: Ministério da Saúde; 2020 [cited Out. 6, 2025]. 128 p. Available from: http://bvsms.saude.gov.br/bvs/publicacoes/estrategia_saude_digital_Brasil.pdf

9. Brasil. Lei nº 13.709, de 14 de agosto de 2018. Dispõe sobre a proteção de dados pessoais e altera a Lei nº 12.965, de 23 de abril de 2014 (Marco Civil da Internet) [Internet]. Brasília: Presidência da República; 2018 [cited Out. 6, 2025]. Available from: https://www.planalto.gov.br/ccivil_03/_ato2015-2018/2018/lei/L13709.htm

10. Oliveira D. Hermenêutica do desenvolvimento. São Paulo: Matrioska Editora; 2023.

11. Moraes ARA, Lisboa AF. Regulamentação da inteligência artificial na União Europeia: estrutura ética, classificação de riscos e possíveis reflexos na medicina. UNISANTA Law Soc Sci [Internet]. 2024 [cited Mar. 9, 2025];13(2):16-29. Available from: https://periodicos.unisanta.br/LSS/article/view/2473

How to cite
Lisboa AF, de Oliveira D, Lamy M. Application of Charles Edward Lindblom's Incrementalist Theory to Emerging Technologies in Law and Health Education. Cadernos Ibero-Americanos de Direito Sanitário. 2025 oct./dec.;14(4):142-150
https://doi.org/10.17566/ciads.v14i4.1358

Copyright
(c) 2025 Andressa Felix Lisboa, Danilo de Oliveira, Marcelo Lamy.
(cc) BY