Journal of Systemics, Cybernetics and Informatics (2024) 22(1), 231-281
https://doi.org/10.54808/JSCI.22.01.231

Disciplinary Inbreeding or Disciplinary Integration?[1]

Nagib Callaos

Founding President of the International Institute of Informatics and Systemics (IIIS)
Founding Promotor of the International Association FOR Transdisciplinary Communication (ATDC)

Abstract

This article explores the risks of disciplinary inbreeding caused by disciplinary isolations in what has been called disciplinary silos. Disciplinary isolation necessarily reduces the disciplinary intra-variety and, according e the First Law of Cybernetics, it diminishes its level of adaptability. Hence, an isolated discipline loses the effectiveness to adapt to the changes that the same discipline may generate, let alone the changes generated by other disciplines and by the ex-disciplinary real world, This is an evident and real problem that disciplinary silos seem not to be perceiving or do not want to perceive.

To face this situation, it is necessary to generate the opposite phenomenon. Since the meaning of Academic Inbreeding is associated with the analogy of Biological Inbreeding, then what we need is the analogy of its opposite in Biology, which is heterosis, hence it would be called Disciplinary Heterosis", which is oriented to inject variety in disciplines by means of relating them, and the more distant the better as it happens in biological evolution.

This "disciplinary heterosis", analogously to "biological heterosis" may lead to innovation and a more complete understanding of complex problems. and this is achieved via inter- and trans-disciplinary communication and collaboration. This necessarily requires inter- and trans-disciplinary communications and collaboration. This is a source of diversification, variety (in terms of The First Law of Cybernetics), individual analogical thinking, collective parallel thinking, and, hence, individual and collective creativity.

This is the context of the article, which is mainly centered on Disciplinary Inbreeding, its risks, and potential dangers. The implicit objective of this focus is to reason the importance and even the necessity of Disciplinary Integration,just as which would be achieved via inter- and trans-disciplinary communication, education, and continuous self-education. This article is a step toward complementing other articles related to the importance of inter- and transdisciplinary communication oriented to show that what has been important is increasingly being required, because of the risk and potential dangers that may be present if Disciplinary Inbreeding is not balanced with its opposite: "Disciplinary Heterosis", through disciplinary integration, via inter- and trans-disciplinary communication and education.

[1] This article is based on subsections 6.2.2. and 6.2.3 of a previous published article by the same author (Fostering Inter-Disciplinary Communication (FIC), 2021), which has beedn revised and extended.

1. **Context**

This article will focus on the notion of Disciplinary Inbreeding in order to show the negative dimension when it is not related to its opposite notion of Disciplinary Integration, which is achieved via inter- and trans-disciplinary communication. The latter allows Disciplinary Integration required for what we may call "Heterosis and Hybrid Disciplines" (Cohen & Lloyd, 2014)

1.1. Disciplinary Heterosis

Heterosis[2] and Hybrid Disciplines are what may ameliorate the negative effects of Disciplinary Inbreeding and potentiate the epistemological and pragmatic effectiveness of academic and scientific disciplines. Inter- and trans-disciplinary communication are highly effective and potentially necessary conditions for Heterosis and Hybrid Disciplines.

Given that heterosis refers to the phenomenon where the offspring of two genetically different parents exhibit enhanced or superior traits compared to either parent. This phenomenon is commonly observed in plant and animal breeding, where crossing two distinct varieties or breeds can result in offspring with improved characteristics such as growth rate, disease resistance, or yield. Since the meaning of "Academic Inbreeding" is associated with its analogy with "Biological Inbreeding"; similarly, the meaning of "Academic Heterosis" is associated with its biological meaning, via analogical thinking, Consequently, "Academic Heterosis" would mean the phenomenon where interdisciplinary collaboration or the integration of diverse disciplinary perspectives leads to increased productivity, innovation, and effectiveness within a specific field or academic domain. Based on our experience we may add that these phenomena are mostly based on 1) individual analogical thinking processes triggered by comparing or relating knowledge from

[2] Heterosis also called, hybrid vigor refers to the offspring of two different parents (think different plant varieties or animal breeds) end up stronger or better in some way than either of their moms and dads. This is

different disciplinary domains, and/or collective parallel thinking in multi-disciplinary teams via, inter- or trans-disciplinary communication.

The above means that the academic heterosis phenomenon may, and usually is, via interdisciplinary collaboration where the integration of diverse disciplinary perspectives may lead to increased creativity, productivity, innovation, and effectiveness within a specific field or academic domain. Just as in biological heterosis, where the offspring exhibit superior traits due to genetic diversity from two different parents, academic heterosis occurs when diverse perspectives and approaches from different disciplines are combined, resulting in enhanced outcomes. This phenomenon often arises from individual analogical thinking processes and collective parallel thinking in multidisciplinary teams, facilitated by effective inter- or transdisciplinary communication.

This is the reason why we, at the International, Institute of Information and Systemics (IIIS) have been, for 28 years, and via more than 100 academic conferences (in English and Spanish) trying to foster inter-disciplinary communication conferences via multi-disciplinary conferences. In the last 2 years, we have been promoting the consolidation of an International Association FOR Trans-Disciplinary Communication (ATDC) which already had two meetings with transdisciplinary presentations, some of which generated written communication for a Journal's Special Issue where this article has been included.

This article is a continuation of several others related to fostering interdisciplinary communication[3], the intellectual rigor of inter- and transdisciplinary communication[4], Intellectual Development via Transdisciplinary Communications[5], etc. In this article, we will focus on the notion on the notion of "Academic

---

because they inherit a mix of genes from each parent, and sometimes that mix leads to amazing results, like faster-growing crops or disease-fighting livestock.

[3] (Callaos, 2021)

[4] (Callaos, The Notion of Intellectual Rigor: A Systemic/Cybernetic Approach, 2020), (Callaos & Marlowe, Interdisciplinary Communication Rigor, 2020)

[5](Callaos, Intellectual Development via Trans-Disciplinary Communication, 2022)

Inbreeding" because several articles have already been oriented to the means for inter- and/or trans-disciplinary and, consequently, as means for Disciplinary Integration and, hence, for Academic Heterosis

1.2. Disciplinary Inbreeding

Disciplinary inbreeding refers to a phenomenon where academics and/or researchers within an academic discipline primarily engage with and cite literature from their own field, which often generates overlooking valuable information and insights from related or other disciplines. We preferred to use the term **"disciplinary inbreeding"** instead of **"intra-disciplinary inbreeding"** because the second is usually used to refer to the interactions between individuals and the pattern in a discipline while the former includes the interacting individuals or persons, as well

At the personal level, **disciplinary inbreeding may structure the respective neurological networks to reflect the respective 1) semiotic disciplinary system**, 2) epistemological values, 3) methods and methodologies, and 4) participate in the formation of a disciplinary culture and, frequently, even disciplinary tribes. (Becher & Trowler, 2001), The latter is a consequence at the collective level but individual participation is, simultaneously, cause and effect, and the individual participation is in the process (take part in) and participation in the product (take part of). So, no wonder why academic promotional systems are disciplinary oriented. The latter reinforces even the disciplinary orientation of academics and, hence, helps the formation of academic silos and insular thinking.

Such individual and collective insularity increases the probability of reductionist thinking, which affects more the elites because they usually spend more time in a kind of insular thinking and, hence, have reinforced, even more, their neurological network as structured according to the respective disciplinary culture (disciplinary semiotic system, epistemological values, methodologies, mental habit, etc.). Even noble laureates who contributed enormously to their field were almost blinded by

their disciplinary reductionism due to "disciplinary inbreeding and/or self-inbreeding i.e., patterns of interaction within a discipline and the potential for individuals to limit their engagement with external perspectives or diverse voices. This has affected, even, Noble Laureates

For example, why did the Nobel Laureate (in Physiology or Medicine) Konrad Zacharias Lorenz refer, to, other human beings as "***moral imbeciles***" just because they are from other races? Was he really regretful about his many writings on racial hygiene and his "scientific" reasons for the necessity of the Nazi eugenics? Isn't this a matter of scientific abuse or a scientist's intellectual deformities caused by disciplinary inbreeding, which is (in our perspective) the most dangerous form of academic inbreeding?

Later, we will provide more historical examples in other disciplines: which, for being extreme cases, may illustrate what disciplinary inbreeding may generate. Meanwhile, let us go to contemporaneous and not extreme examples

Robert E. Kraut (2003), at Carnegie Mellon University, referring to the publisher literature in the fields of Human-Computer Interaction (HCI) and Computer-Supported Cooperative Work (CSCW), wrote

> ¨Social psychology provides a rich body of research and theory about principles of human behavior, which should be applicable to the design of HCI applications, especially applications to support multiple individuals communicating or performing some task …[and] an enormous amount about how people form attachments to each other, how groups form and develop, and how groups organize, to work together productively…However, researchers and developers in the field of Human-Computer Interaction have rarely taken advantage of this trove of empirical phenomena and theory. There are several reasons why this body of research has been under-exploited. First are the ***standard problems of disciplinary inbreeding.*** In CSCW, as in many fields, researchers tend to know about

> and, therefore refer primarily to research reports, published in the restricted set of journals which they consider core to the discipline… articles published in CHI or CSCW proceedings and rarely refer to the reference literature in cognitive psychology, sociology, anthropology, or social psychology" (Kraut, 2003) [Italics and emphasis added]

The quote above is related to ***disciplinary inbreeding*** in Human-Computer Interaction (HCI) and Computer-Supported Cooperative Work (CSCW) which are interdisciplinary fields, then we may imagine what may be going on in disciplinary fields and intra-disciplinary communication.

Knowledge Integration processes support avoiding Disciplinary Inbreeding and create systemic and cybernetic relationships among disciplines and, hence, more complexity in the integrated knowledge as well as in the neurological networks in disciplinary and inter-disciplinary academics and researchers. This increase in complexity generates additional emergent properties e.g., synergies, creativity, etc.) that are shared by all included disciplines and hence by academics and researchers in disciplinary and inter-disciplinary fields. What follows is mainly based on what may support the generation of these emergent properties and what may be required. We will also refer to other potential causes or effects of disciplinary inbreeding and how they may be avoided.

In the following section, we will address potential emergent properties of relating systemically Analogical and Logical Thinking in Disciplinary Dynamics which also is a means to avoid Disciplinary Inbreeding

2. Balancing Analogical and Logical Thinking in Disciplinary Dynamics

Logical thinking is predominantly utilized within disciplinary contexts, while analogical thinking often emerges in interdisciplinary communications, even in casual conversations. The cybernetic nature of interdisciplinary dialogue may

implicitly regulate and reinforce each participant's perspective while also generating analogical insights alongside logical ones. Therefore, informal conversations among academics from related or different disciplines can serve to counteract disciplinary inbreeding to varying degrees. To facilitate this, disciplinary departments may benefit from having at least one intellectually curious, versatile individual akin to Alexander von Humboldt who can bridge connections between researchers and foster interdisciplinary exchange. Considering this, it could be argued that academic incentives should be in place to encourage the presence of such individuals within disciplinary departments, thereby lowering the likelihood of disciplinary inbreeding

We are not using here the word “inbreeding” as an expressional metaphor but as an analogy between two different contexts: the biological and that of a socio-intellectual system which is how a discipline may be perceived and, even, conceived.

Consequently, let us let's explore the term "inbreeding" within a socio-intellectual context, focusing on its analogy as related to what may mean a lack of diversity which may common to biological and socio-intellectual systems. This may allow us to spotlight the risks linked to intellectual isolation or a lack of diversity within academic or professional domains. We encourage drawing comparisons across various contexts to enhance comprehension of these risks, highlighting the interconnectedness of analogical and logical thinking. This discussion extends to fields such as Social Psychology and Information Systems Engineering, showing how staying insular within a discipline can impede collaboration across disciplines. We emphasize the importance of adopting a balanced approach that nurtures both creativity and coherence, advocating for intellectual diversity to avoid the drawbacks of disciplinary isolation.

Using the word “inbreeding” as an analogy triggers our analogical thinking which, in turn. Is input to our logical thinking. This will support to highlight the risks associated with intellectual isolation. i.e., lack of diversity within academic or professional fields. Drawing parallels between different contexts promotes a more

holistic understanding of complex phenomena because considering multiple perspectives, may transfer knowledge across domains, and engage in critical and creative thinking. Considering multiple perspectives increases the related complexities into a meta-perspective which, in turn, may generate emergent properties that would include critical and creative thinking. This is easily observed when developing computing-based information systems because, usually, their users and, especially end-users have different perspectives that should be related in a feasible, desirable, and coherent system.

Relating knowledge from different disciplines, often, requires a similar process of analogical/logical thinking, generating diversity in our thinking which is a necessary condition 1) avoiding disciplinary inbreeding and 2) for getting more complexity in our knowledge. The latter is because of the new relations created by the perceived analogies and subsequent logical thinking. This systemic increase in our knowledge may generate emergent properties, including creativity and insights. These, usually, are products of the new cybernetic relationships created among different neurological nets. Creativity and insight are usually generated by positive feedback among new synapsis created by the new processes of analogical and logical thinking.

It is good to remember that Analogical and Logical Thinking complement and require each other. Analogical thinking alone may create intellectual chaos and Logical Thinking alone may create intellectual sterility. Consequently, a balance between the two is essential for intellectual coherence, via logical thinking, and creativity, via analogical thinking. This balance may be achieved by relating knowledge from different disciplines. This means that avoiding discipline via relating to other disciplines has also the added value of developing our intellectual skills in relating logical and analogical thinking, which may provide improved support in the context of the discipline and, hence in the disciplinary community, relating to other disciplines has added value not just to the intellect of who is making the relation but also to the common good of the respective disciplinary

community because creativity levels is increased in the same disciplinary community.

For example, social psychology offers valuable insights into human behavior principles that are relevant to Human-Computer Interaction (HCI) design, particularly for applications supporting group communication or task performance. Despite possessing extensive knowledge about human attachments, judgments, group formation, and collaboration, social psychologists' expertise remains underutilized by HCI and CSCW researchers and developers. This phenomenon can be attributed to disciplinary culture and the existence of disciplinary tribes, as Becher and Trowler (2001) have observed, providing detailed explanations for this occurrence.

The issue of potential disciplinary inbreeding is not confined to the natural sciences but also extends to the social science. For example, at a broad level within the social sciences, Hofstede (1994) contends in a widely cited preface that "Academic inbreeding and atomization in the West have resulted in extensive production of irrelevant speculations. The system has become self-destructive, ***punishing rather than encouraging borrowing from related disciplines."*** (p. ix) [Italics and emphasis added]. This perspective resonates across various academic disciplines, particularly when addressing real-world issues embedded in social contexts.

This situation is even worse in the case of relating Natural and Social Sciences, Science and Engineering, etc. For example, as we anticipated above, social psychology offers valuable insights into human behavior principles applicable to Human-Computer Interaction (HCI) design, especially for applications supporting group communication or task performance. While social psychologists possess extensive knowledge about human attachments, judgments, group formation, and collaboration, this wealth of information remains underutilized by HCI and CSCW (Computer-Supported Cooperative Work) researchers and developers. Why is this happening? Disciplinary culture and even disciplinary tribes as (Becher & Trowler, 2001) affirmed, providing detailed reasonings.

The above-mentioned “under-exploitation”, due to the lack of inter-disciplinary relationships is attributed to ***disciplinary inbreeding***. This means that this phenomenon is impacting not just the researchers, and their disciplinary communities, as we argued above, but also other disciplinary communities. This usually happens when researchers primarily reference journals considered core to their discipline, neglecting valuable literature, for example, in the context of HCI/CSCW: cognitive psychology, sociology, anthropology, or social psychology are under-exploited which affect not just the fields of HCI/CSCW but also the end users and the organization using what is produced and developed by these fields. Another reason for this specific situation is the mismatch between the goals of HCI/CSCW research, which primarily aims at problem-solving, and the goals of social psychology, which seeks to uniquely determine the causes of social phenomena. (Kraut, 2003). Interdisciplinary communication would probably solve this mismatch.

Social psychology's experimental approach, emphasizing isolating variables to identify causal relationships, may not align well with the contextual complexities of real design problems. HCI/CSCW designers often require detailed, contextual information, while social psychology tends to abstract such details for generalizability.

The fundamental differences between problem-oriented designers and theory-oriented social psychologists lead to knowledge gaps and difficulties in applying social psychological insights to design problems. For example, while social loafing research indicates that group attractiveness and perceived uniqueness influence group participation, it lacks concrete guidance on how to make a group attractive or which factor is more influential. Designers often turn to ethnographic research for detailed context but sacrifice generalizability. The chapter concludes that bridging these gaps is essential for effective interdisciplinary collaboration in HCI/CSCW research and design. (Kraut, 2003). This is just an example of what may separate disciplines that should complement each other. It may be suggested that disciplinary cultures have the same kind of mismatch as other kinds of different cultures.

Information Systems Engineering faces a similar issue of disciplinary inbreeding and a lack of interdisciplinary research, education, and communication. The two main components of information systems are both: human information processing and data computer processing, i.e. human and computer systems to be developed by 1) computer scientists or engineers and 2) end users and managers, present a complex developing system that, certainly, cannot be addressed *combining linear and nonlinear thinking.* The latter is especially necessary because of the complexity of the procedure and the meta-complexity of, at least, two interacting human groups with inside interactions as well as interactions between at least, two groups create at least two complexity layers with their respective emergent properties which should be opportunely addressed. Here we have not just the computing culture but also the organizational culture and this is the main (if not the unique) reason that systematic methodology failed, as was the case, for example, of top-down methodologies. Since the seventies, we knew that the well-known Software Crisis was not a technical problem but a human problem, including adequate relationships between disciplinary and organizational cultures.

\

Many Computer Science departments, which frequently offer education in this domain, unintentionally biased the curriculum toward computing, emphasizing programming and databases over the broader aspects of Informatics and Science, even in logic. There is a need for a balanced approach that should include *means-end logic* and fosters skills for *means-end thinking*, preventing the confusion of means with ends, which is a "special case of incoherence" (Váry & Vecsenyi, 1983)

3. Means-End Logic[i]

> "Human plan-construction is generally based on means-end reasoning [or Logic]. Means-end reasoning is concerned with finding the means for achieving goals. The basic idea is a simple one: to achieve a goal,

> we consider an action that would achieve it under some specified circumstances and then try to find a way of putting ourselves in those circumstances in order to achieve the goal by performing the action. Putting ourselves in those circumstances becomes a subgoal. The idea is to work backward from the goal through subgoals until we arrive at subgoals that are already achieved. The resulting sequence of actions constitutes a plan for achieving the goal. A precise logical theory of plan-construction is formulated that completely characterizes means-end reasoning." John L . (The Logical Foundations of Means-End Reasoning, 2006)

In the context of this article, this section may start with the question: "Is a discipline a means or an end itself for the respective disciplinary community?"

Let us try a short answer and then address more related details. Academic disciplines serve as valuable organizational frameworks, yet they should evolve in response to societal needs and progress rather than becoming rigid ends in themselves. Disciplines are means to the end of advancing knowledge and addressing important problems, rather than the ultimate purpose. As our understanding of the world changes and new challenges emerge, it is essential for disciplines to remain flexible and adaptable, ensuring they effectively contribute to the advancement of knowledge and the resolution of pressing societal issues.

To have a discipline adaptable to the changes they may be generating, they should be able to internalize the First Law of Cybernetics, i.e., Variety Requisite: "Just Variety Absorb Variety". This necessary variety is required to adapt to changes, generated by the disciplines, along with interdisciplinary fields of knowledge, which is what makes each discipline a means not an end-in-itself.

Considering the complexity and interconnectedness of modern challenges, interdisciplinary collaboration has become increasingly vital. By embracing the First Law of Cybernetics and fostering diversity within their ranks, disciplines can

remain responsive to evolving needs and contribute to holistic solutions. Therefore, based on the means-ends Logic, Ethics (support our supporter), and the First Law of Cybernetics, the answer seems to be: A discipline is a means, not an end-in-itself."

Let us now, provide a few details related to the question we made initiating this section. There have been, for a long time, reflections and written works on means and ends, in philosophical and ethical contexts using phrases like *"means-end reasoning",* but it seems to be the Nobel Laureate Herber Simon who used the phrase *"means-end logic"*. This was one of the results of his work on relating "Logical Positivism"[6] and "Teleology"[7] in the context of the Systems Approach because he was a well-known theorist and consultant on System Theory, especially in its application to Organization Management, Decision Science, and Artificial Intelligence. His work laid the groundwork for understanding how individuals engage in purposeful reasoning (Simon, Administrative Behavior: a Study of Decision-Making Processes in Administrative Organization, 1957/2013), (Simon, 1996), taking into account the available means to achieve desired ends, within the framework of *bounded*[8] *rationality*[ii] and supported by his work on relating and even integrating "*Logical Positivism*" and "*Teleology*".

It is noteworthy that Herbert Simon's intellectual pursuits primarily centered around mathematical optimization within the realm of Operations Research. This discipline focuses on optimizing the achievement of one or more objectives while being restricted by constraints through the use of mathematical models. Simon's contributions extended beyond traditional. This is done via mathematical

[6] Logical positivism was a reductionist approach. "Essentially, logical positivism is empiricism pushed to the extreme, absolutely as far as it can go…Logical positivism is a robust and vigorous defense of science as the Vienna Circle … understood science to be conceptualized and practiced in the late 1800s and early 1900s … The logical positivists wanted to establish that only empirical, publicly examinable evidence could furnish statements of belief with the warrant necessary for them to become truths" (Bennett, 2009)

[7] In the context of the Systems Approach, "teleology" relates to the study or understanding of systems with a focus on their ***purpose (telos),*** goals, and intended outcomes, .

[8] Simon introduced the concept of bounded rationality, showing that decision-makers often operate with limited and fuzzy information, cognitive and time restriction. Bounded rationality suggests that *human beings do not* ***optimize*** *but* ***satisfice*** when making decisions, i.e., they choose the most *satisfying option that meets a satisfactory criterion*, and not necessarily and exhaustively optimizing decisions. I.e., each and all decisions. His notion aligns with the idea of *bounded* reasoning within a realistic framework, with its always present

optimization methods or qualitative modeling. He introduced two key innovations: first, he advocated for a *shift from the traditional emphasis on maximization to a concept he termed "satisficing,"* wherein solutions aim to meet satisfactory criteria rather than maximizing objectives. Second, he incorporated *subjective constraints* stemming from "bounded rationality"[9] into factual restrictions, reflecting the inherent subjective and external limitations (restrictions) of human decision-making.

Philosophers, especially those concerned with ethical and practical reasoning, have long delved into the relationships between means and ends. Concepts such as teleology, the study of purpose or ends, inherently entail considerations of means. Ethical theories like consequentialism frequently involve analyzing the means that lead to desired ends."

Consequently, Herbert Simon's specific formulation of "means-end logic" in the mid-20th century, as discussed in his book "Administrative Behavior,"[10] contributed to the application of these ideas in Decision Science[11][iii] and Artificial Intelligence. Simon's work focused on how individuals, particularly in organizational contexts, engage in means-end analysis during decision-making processes. This means that we are using the notion of "Means-End Logic" in the contexts of "Decision-Making" and "means-end reasoning".

---

restrictions. Decision-makers are rational within the bounds of their limitations, aiming for satisfactory outcomes rather than exhaustive optimization.

[9] "Bounded Rationality" is a notion used by Herbert Simon to reffer to the fact that individuals make decisions that are rational within the bounds of their available information and cognitive resources, rather than always selecting the optimal choice. This notion reffer to the fact related to *how individuals make decisions in real-world situations where perfect rationality is unattainable.*

[10] (Simon, Administrative Behavior: a Study of Decision-Making Processes in Administrative Organization, 1957/2013)

[11] Above, we provided the meaning of "Teleology" in the context of The Systems Approach, which provides it meaning in the context of "Decision Making", especially for showing the complete coherence among both meanings. So, "Teleology" in context of "Decision Making" it relates to aligning decisions with overarching telos (purpose) and its corresponding goals, sub-goals, etc. It provides a framework for purposeful and goal-oriented decision processes, ensuring that choices contribute to the achievement of desired outcomes. This is coherent and completely related to the 1) decisions to be made in System Design, as well as to 2) to identify the telos related to the systems and 3) to understand the functioning of a system according its designing telos.

Simon's "means-end logic" is (as well as in more accepted meaning) a problem-solving strategy, and in general a process, that emphasizes the generation of subgoals[12] contributing to reaching the end, end-goal, purpose, telos (in its sense of purpose or intention. not on its sense of not in the sense of "Final End", or in its ontological sense[13]). Simon's "means-end logic"; which also is its sense in general, had and still has applications in various fields, including artificial intelligence[14] child development[15], and epistemology[16],[iv].

4. Effects of Disciplinary Inbreeding Via Means-End Logical Fallacies

A discipline is an ***implicit*** means in the academic world and a very ***explicit*** one in the real world, i.e., real-life problems, real-life necessities, Society at Large, etc. The logical fallacies in Means-End Logic are among the implicit or explicit sources of intellectual corruption, as well as the cause and effect of disciplinary inbreeding which raises problematic effects as the following (which will be reasoned with brief details in the rest of this section.

Implicitly or explicitly, perceiving a discipline as an end in itself and not as a means in the context of a larger whole presents implications across academic and real-world contexts. Taking a discipline as an end in itself raises logical, intellectual, pragmatic, and ethical concerns.

---

[12] We named them goals in Figure 2, because we used the notion of end (purpose, telos) for the main goal.
[13] The ontological sense of telos refers to 1) the ultimate End of Being, or 2) that which is integral to the nature or essence of an entity or phenomenon. It signifies the intrinsic direction or aim that defines and guides the development or bring or existence of something.
[14] (Simon, The Sciences of the Artificial (Third Edition), 1996),
[15] Means-End Logic is applied to child development by examining how children use goal-oriented reasoning to understand and interact with their environment.
[16] A good example regarding this issue is Oliver Schulte's (Means-Ends Epistemology, 2001) In general, an important application is goal-oriented reasoning for shaping processes within epistemological inquiries, contributing to the exploration of reasoning, knowledge acquisition, and truth pursuit in knowledge theory and philosophy. This is especially important in Second Order Cybernetics that also requires reflexivity and not just a description of what has been observed, i.e. observers should also observe their own thoughts, i.e., self-assess their thinking process and even try to describe it to the external world

From a **pragmatic** standpoint, it may lead to disciplinary inbreeding, risking the loss of sight of the original purpose and resulting in insularity. This diminishes adaptability to changes within the disciplines themselves, as it reduces internal variety, consequently lowering adaptability, (according to the First Law of Cybernetics). to new challenges in both academic and real-life environments.
In the realm of **logic**, particularly in means/ends logic, it embodies a **logical fallacy**. **Philosophically**, this approach signifies a dual intellectual corruption, as it compromises the essence of both means and ends. Conversely, recognizing disciplines as means to broader ends fosters a dynamic and adaptive intellectual landscape. This approach stimulates continuous variety within each discipline, leading to an exponential increase in personal and collective intellects. This, in turn, enhances human adaptability as a species.

In an **educational context**, treating means as ends in themselves undermines educational design, which is fundamentally based on ***identifying means to achieve specific ends***. Consequently, such a perspective can distort the educational process, introducing disarray and chaos. This, in turn, leads to multiple sources of ineffectiveness and inefficiency.

Similar challenges may arise in **organizational or social contexts**."

Now, we will provide, below, a few brief details regarding the above short paragraphs

Above we used the word “corruption” in its etymological meaning, not necessarily in its moral sense. "Corruption" stems from the Latin words "com," meaning "altogether" or "thoroughly," and "rumpere," meaning "to break" or "to destroy." So, "corrumpere" conveys the idea of breaking something down thoroughly or causing it to decay[17]. When we treat a means as an end in itself, we are breaking it down thoroughly and destroying its essence as a means for an end. Transforming a

[17] (Online Etymological Dictionary)

means into an end is not just a logical fallacy but also a destruction of the means as a means — a change in its essence.

Taking the means as an end in itself is not just a logical fallacy but also intellectual corruption. It is not surprising that treating a discipline as an end in itself, while being a means to generate knowledge and solve real-life problems, is also a source of disciplinary inbreeding and intellectual stagnation.

If we consider a discipline as a means — a tool or framework for generating knowledge and solving real-world problems — there is inherent risk when it is treated as an end in itself. Disciplines, like means, have specific purposes designed to contribute to broader goals, such as understanding phenomena, advancing knowledge, and addressing societal challenges.

When a discipline is treated as an end rather than a means, there is a risk of losing sight of its original purpose and becoming insular. This can lead to disciplinary inbreeding, where ideas, methodologies, and perspectives are confined within the boundaries of that discipline. In such cases, interdisciplinary insights may be overlooked, limiting the adaptability of the discipline to address complex, multifaceted problems.

The metaphor of disciplinary inbreeding or incest may be more than an expressive metaphor; it underscores the potential dangers of intellectual insularity and lack of diversity in thought within a discipline. It suggests similar reasons for decay, along with a closed loop of ideas and methodologies that may hinder innovation, the discovery of novel solutions, and the ability to tackle real-world challenges effectively.

In general, intellectual progress, in individual intellects, disciplines, inter- and trans-disciplinary fields, and communication, often thrives on the cross-pollination of ideas, interdisciplinary collaboration, and the integration of diverse perspectives. Recognizing disciplines as means to broader ends, rather than isolated ends in

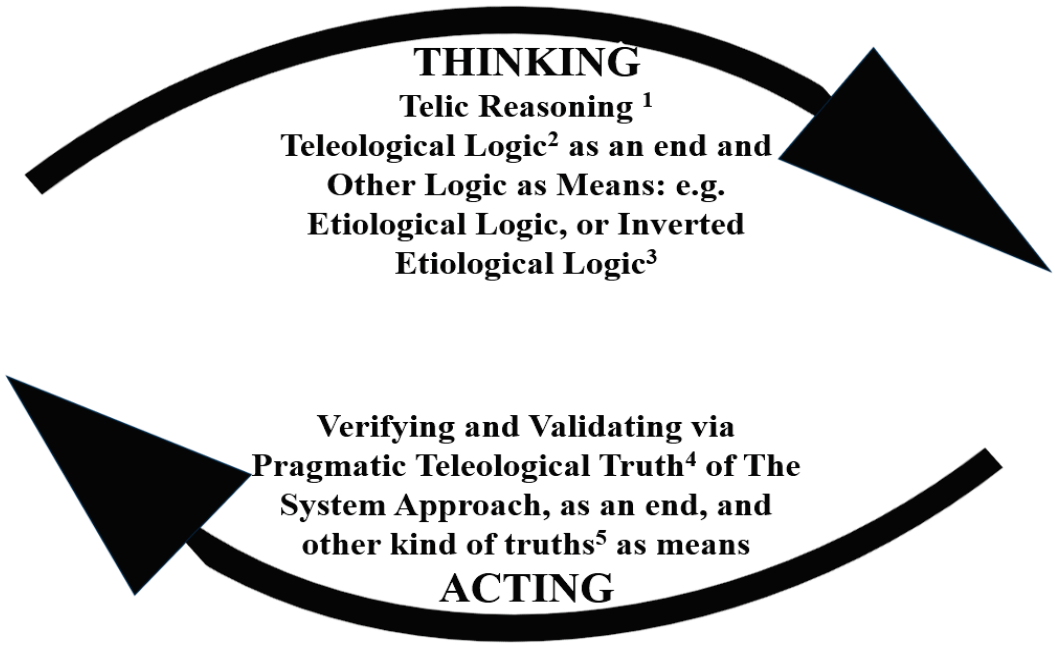
themselves, encourages a more dynamic and adaptive intellectual landscape. This understanding is crucial for fostering creativity, innovation, and the ability to address the multifaceted challenges of the real world.

All this indicates that avoiding disciplinary mental jails supports not just the development of individual intellects but also collective intellects — each intellect collectively related in a network of intellects, forming a meta-network of individual neural networks related by transdisciplinary languages to create a collective hybrid of neural-semiotic meta-systems.

Figure 1 shows a visual summary of the implicit and/or explicit cybernetic process of thinking/acting based on means-end logic, which, we suggest, should be present and explicit in almost any human activity, especially because it, almost always, supports human thinking-acting activities.

Figure 2 provides more details regarding the relationships between ends and means. The thinking process should flow from the end (the "why") to its means (the goals) and from the goals to the how. Conversely, action should proceed from the means to the end — from the "how" to the "what" and from the "what" to the "why." Design-centered professionals, like engineers, implicitly or explicitly connect thinking and action through reciprocal or potentially cybernetic relationships, often employing a combination of Action Research, Action Design, and Action Learning.

Questions emerge regarding whether students are adequately prepared for such processes, especially when their education predominantly revolves around science courses. While these courses are crucial for engineering and design-centered careers, they may not be sufficient. Science serves as an end in the education of scientists but is just one means of engineering education. The potential confusion of means with ends in engineering education, compounded by intra-disciplinary inbreeding, could significantly impact design-centered professions and the readiness of students for real-life problem-solving.



1. Telic reasoning involves a purposeful and goal-oriented approach to problem-solving, decision-making, and planning, which includes a thoughtful consideration of the means required to achieve a desired end
2. While teleological logic often involves considering ends or purposes, end-means logic specifically deals with the logical relationship between ends and the means used to achieve those ends.
3. While Etiological Logic try to identify the cause(s) of an effect, inverted Etiological Logic is an insightful starting with the intended effect and working backward to determine the potential causes or factors that could lead to that effect. This process may indeed draw on insights from remembered historical cause-effect processes to inform your reasoning.
4. The Pragmatic Teleological Truth of The Systems Approach emphasizes a purpose-driven examination of system components, considering how their interactions contribute pragmatically to the overall success of the system's objectives or telos.
5. Example of Other Truths are: Consensual Truth, that Characterizes the empirical Science, the analytical science that orient rational inferences, the Dialectical Truth used in legal processes, etc.

Figure 1: Cybernetics processes relating almost all human being activities, implicitly most of the time. Among the activities explicitly oriented by the abode schematically shown processes are Action-Research, Action-Learning, Action-Design, incremental planning, Systems, exploratory projects (involve an open-ended approach where the emphasis is on learning, experimentation, and gaining insights rather than achieving a specific set of predefined goals), as well as explicitly designed methods or methodologies for explicit **Action-Thinking**.

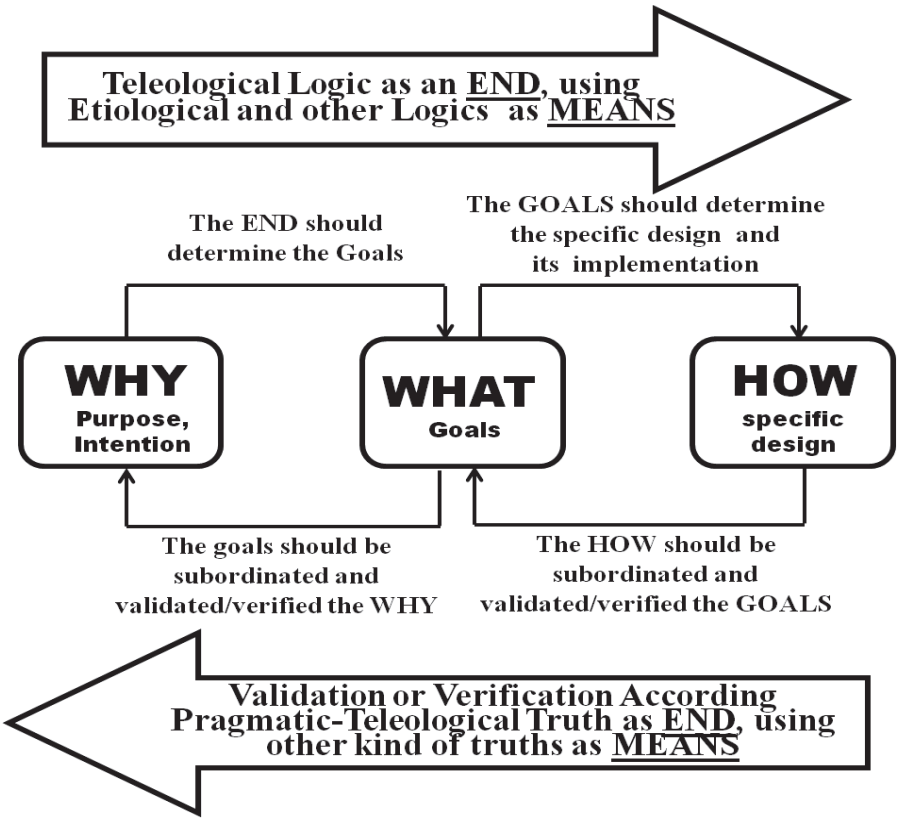


Figure 2: Thinking-Action processes for designed centered Research and Development, where Etiological and other scientific logics are not an ends in themselves (as it is the case of scientific activities) but MEANS used for achieving the teleological logic. Similarly scientific truths are means used in thinking-action processes oriented to the pragmatic-teleological Truth, required in design-centered Research

Given the multidisciplinary nature of real-life problems, proficiency in inter- and trans-disciplinary thinking and communication becomes imperative, accentuating the adverse effects of intra-disciplinary inbreeding. This prompts the question: Are we providing students in engineering and other design-centered, real-life problem-oriented careers with the necessary intellectual preparation?

5. Cybernetic Relationships Between Etiological Logic and Means-End Logic

Etiology Logic[18] and Means-End Logic have implicit cybernetic relationships, which may be potentially enhanced when explicitly inserted within the framework of a systemic methodology that explicitly relates them.

The study of why things occur, known as etiology, proves pivotal in identifying causes and effects, communicated through the language of scientific causal notation. Causal inference, delving into the independent, actual effect of a phenomenon, is a pervasive study across all sciences. Consequently, a nuanced understanding of these relationships proves essential at both individual and group levels, particularly within multidisciplinary teams addressing real-life problems requiring interdisciplinary communication

While Etiology Logic progresses from "effects" to "causes", Means-End Logic navigates from "End" to "Means". They fundamentally embody Polar Opposites. Effective "Means" would be the "cause," and the "End" would correspond to the "effect", using the perspective of cause-effect logic. Consequently, via analogical thinking, Means-End Logic represents the opposite direction of cause-effect thinking. This can be analogized to mathematical derivation and integration, where derivation would analogically align with Etiology, and integration would correspond to Means-End Logic (given the end, find the means).

Another analogical example is mathematical analysis and synthesis. Mathematical Analysis thinking goes from potential theorem axioms (discovery direction) and synthesis reasoning goes from axioms to theorems (mathematical explicit proof) Mathematical analysis also requires heuristic thinking and Mathematical Synthesis requires just deductive logic. Mathematical Analysis would be the analog of End-Means reasoning and Mathematical Synthesis would be the analog of Etiological Logic, So, the relationships between Mathematical Analysis and Synthesis are

[18] Etiology logic is the logic of the reasoning used to understand the underlying causes or origins of phenomena,

similar, analogical, to the relationships between Etiology Logic and Means-Ends Logic.

Another analogical example of the relationship between Etiology Logic and Means-End Logic finds resonance in the analogy with mathematical derivation and integration. Etiology Logic, moving from effects to causes, mirrors mathematical derivation, employing the derivative to unveil the cause given the effect. Conversely, Means-End Logic, transitioning from end to means, parallels mathematical integration, utilizing the integral to discern the means given the end. This analogy reinforces the concept of a cybernetic relationship, illustrating a dynamic and interconnected problem-solving approach and an understanding of causal relationships.

The interplay between these logical frameworks, traversing from effects to causes and from ends to means, accentuates intricate feedback loops and mutual influences. This cybernetic relationship holds particular relevance at both individual and multi-disciplinary group levels, especially in real-life problem-solving scenarios necessitating interdisciplinary communication.

The study of why things occur, known as etiology, proves pivotal in identifying causes and effects, communicated through the language of scientific causal notation. Causal inference, delving into the independent, actual effect of a phenomenon, is a pervasive study across all sciences. Consequently, a nuanced understanding of these relationships proves essential at both individual and group levels, particularly within multidisciplinary teams addressing real-life problems requiring interdisciplinary communication

It may be even worse if Etiology is taken as an end in itself and not as a means in the context of teleological thinking. This would certainly worsen the effect of intra-disciplinary inbreeding. Etiological thinking is an end for scientists, but it is one of the important (and potentially necessary) means for R&D activities, design-centered professions, and policy/decision-makers, including those in universities (as

academic promotion committees, department chairs, deans, boards, etc.), research centers, grants organizations, publishers, peer reviewers, etc.

6. Semiotic Systems Inbreeding

6.1. Context

The notion of "Semiotic Systems Inbreeding" is oriented to mean the potential undesirable effects of isolating a semiotic system, which would also apply to “Disciplinary Semiotic Systems”. Let us provide some known examples, in order to provide analogical contexts:

Inbreeding in Tribal Semiotic Systems*:* Excessive defensive isolation can lead to inbreeding within cultural semiotic systems, ultimately hindering cultural vitality and resilience in the long term. This motion is supported by historical examples, such as the experiences of Native American tribes during European colonization, where resistance to external influences contributed to cultural vitality stagnation and limited adaptation capability

Religious Inbreeding*;* may be exemplified by some monasteries in several religions: Christianity, Buddhism, Hinduism, Islam, etc., In these cases, monasteries serve as centers for prayer, study, contemplation, and community service, fostering spiritual growth and religious observance within their respective traditions. The etymological meaning of "monastery" as a place of *solitude or withdrawal* can be seen as a common characteristic of religious monasteries across different traditions. May there be similarities between monasteries and disciplines? Would “intellectual monastery” be a metaphor or an analog to “religious monasteries”? the metaphor of "intellectual monasteries" and the analogy between religious and scholarly institutions provide valuable insights into the dynamics of inbreeding within intellectual or disciplinary communities, emphasizing the importance of openness, diversity, and engagement with external perspectives for intellectual growth and innovation.

Classical Logic Inbreeding: the historical dominance (for more than 2000 years) of classical logic, particularly Aristotelian logic, has often limited the exploration and development of alternative logical frameworks and non-classical logics throughout history. This restrictive "inbreeding" effect has constrained the emergence of diverse logical approaches. The emergence of other logical systems, for example, paraconsistent logic is indeed an example of adaptation within the realm of logic that does not exclude classical logic. Unlike some non-classical logics that reject or modify classical principles, paraconsistent logic embraces the possibility of true contradictions while still retaining classical logical principles. Paraconsistent logic may be conceived as a genre that contains classical logic as a species; it Is a generalization that started with Aristotle's Logic, which diversified Logic in order to avoid its stagnation via logical inbreeding So, paraconsistent logic serves as an example of how logic can adapt and evolve without completely discarding classical principles, making it a valuable tool for addressing complex and ambiguous situations where contradictions may arise. It is an example of a non-exclusionary diversification. It may be a good example and a mirror for analogical thinking oriented to insert disciplines in a larger whole. A systemically related system of actual disciplines? Paraconsistent logic may inspire analogical thinking in trans-disciplinary contexts, encouraging scholars to recognize and leverage the diversity of disciplinary perspectives to address complex and ambiguous issues effectively. It exemplifies the potential for disciplines to be systemically related within a larger framework, fostering collaboration and synergy across diverse fields of study. May this be called, by analogy, "para-disciplinary orientation"?

The intention of providing the above examples is to support the perceiving of the notion of "Semiotic Systems Inbreeding" which mainly refers to a reduction in diversity, hence adaptability and creativity in semiotic systems. This leads to a decrease in the richness of signs and symbols and, potentially, limits the capacity for new symbols, patterns, and transformations. The word "inbreeding" is to provide an analogy (not just a metaphor) that is based on the natural tendencies of semiotic systems, that are characterized by specialized communication norms that

resist external influences and perpetuate established semiotic elements. This kind of Semiotic System is among the characteristics of a discipline, so inbreeding disciplinary semiotic systems is one of the causes of disciplinary inbreeding.

We would like to reiterate that the analogy of "inbreeding" is to emphasize the *importance of embracing diversity and remaining open to external influences to foster innovation within a given semiotic context, as well as in any discipline, in general.*

It is evident that the application of the term "inbreeding" to semiotic systems or disciplines, is analogical and does not involve genetic biological processes, but is generated by social interaction. Which is a source of diversity. In general, "inbreeding" refers to the potential reduction in diversity and innovation within semiotic systems if they become more isolated than related to other semiotic systems.

However, it's important to reiterate that this analogy is an input to analogical thinking which, in turn, provides input to logical thinking that supports the production of new knowledge. This analogy highlights the risks of stagnation and a lack of adaptability within semiotic systems if they are not related and, hence, not open to other similar semiotic systems. It underscores the importance of maintaining openness and diversity within semiotic systems to avoid stagnation and promote innovation. This has been shown in the examples provided above,

Since the notions of diversity and variety share the commonality of describing differences within a system or population, it is important to notice that the First Law of Cybernetics, also known as Ross Ashby's "Requisite Variety" Law[19] ; which Ashby translated its mathematical formulation FOR Trans-Disciplinary Communication, in the following way "Only Variety Absorb Variety". This means that a system requires internal variety in order to be able to adapt to the external

[19] Ross Ashby (An Introduction to Cybernetics, 1956)

ones generated by the co-system or system's environment. (Ashby, 1956). *This principle applies to any viable system, including semiotic* systems, which are part of disciplinary systems, that need to cope with changing co-systems or environment. The internal variety (diversity) of any viable system must match the external variety (or potential variety) of the environment or situation, emphasizing the importance of flexibility and adaptability in the face of environmental uncertainty and complexity.

This means that Ross Ashby's "Requisite Variety" Law is highly relevant to semiotic systems in general, and to disciplinary semiotic systems in particular, as it underscores the importance of internal variety in enabling systems to adapt to and control their external environment. It emphasizes the need for flexibility and adaptability in the face of environmental uncertainty and complexity, which is essential for viable semiotic systems.

6.2. Inbreeding in Logic:

In the context of logic, "inbreeding" is used for analogical thinking, in order to describe a closed and insular system that resists external influences, limiting exposure to diverse approaches and hindering adaptability or innovation. This would hinder the ability to adapt to changing circumstances, innovate, or evolve in response to new challenges or opportunities. In a logical or intellectual sense, inbreeding can lead to a lack of diversity of thought, limited problem-solving approaches, and resistance to novel or unconventional ideas.

To avoid "inbreeding" in logic requires openness, diversity, and the incorporation of varied perspectives and approaches to foster intellectual growth, adaptability, and innovation. An example to achieve that is the Paraconsistent Logic which will be shortly in the subsequent paragraph.

Resistance to Non-Classical Logics is an example of what may generate Logical Inbreeding: Some practitioners within the field of classical logic may be resistant to exploring or adopting non-classical logics (e.g., modal logic, paraconsistent logic)

due to a strong adherence to classical principles. This resistance may limit the diversity of logical approaches within the broader semiotic system and, hence, inbreeding phenomena in logicians. In Classical Logics.

Paraconsistent logic[v] is a good example of how the field of logic can *avoid inbreeding* within its semiotic systems. Paraconsistent logic is a type of non-classical logic that allows for the possibility of true contradictions. This departure from classical logic, which typically excludes contradictions, illustrates the field's openness to exploring alternative approaches and avoiding the risk of becoming a closed and self-referential system. Paraconsistent logic takes different Logic Semiotic Systems as ***means*** from which to select according to the nature of the problem. So, we have here, the ***means-ends logic*** as an umbrella to existent and different logical semiotic systems. Consequently, it is evident that Paraconsistent Logic is a logical semiotic meta-system that allows a high diversity of different logical semiotic systems. This is why *Paraconsistent Logic is among the least vulnerable for inbreeding as related to other Logic Systems and it is the means-end logic is its underground or implicit logic supporting it.*

Paraconsistent Logic may, even, use contradictions as a means for identifying the source and reasons of identified contradictions; which may be polar opposites[20] and, as such, represent a "polar truth" or "dialectical truth". This indicates that Paraconsistent logic may identify “truths” even from contradictions.

6.3. Inbreeding in Cultural Semiotic Systems

In this context, inbreeding refers to a condition where a cultural group or community t is somehow more closed than others or in the process of becoming closed, resistant to external influences, and limits its engagement with diverse cultural elements. A well-known example is tribal culture. This kind of culture may

[20] The concept of polar opposites refers to entities or concepts that are completely different or diametrically opposed to each other. These opposites are interconnected and interdependent, often existing in a state of dynamic complementarity and entanglement.

exhibit inbreeding in their cultural semiotic systems. Such cultural inbreeding can lead to the preservation of traditional symbols and practices but may also limit the adaptability and diversity of the cultural system.

Some closed religious communities or isolated ethnolinguistic groups may also be considered examples of cultural inbreeding, particularly if they resist external influences and maintain a highly insular cultural identity.

This can result in a lack of adaptability, reduced cultural diversity, and a tendency to perpetuate established symbols, rituals, and communication norms without incorporating external perspectives. Inbreeding in cultural semiotic systems may lead to stagnation, hindering the dynamic evolution and innovation that comes from embracing diverse cultural influences.

Intellectual cultures: As shown with a high level of detail by (Becher & Trowler, 2001)[21], disciplines are intellectual or academic cultures and, in the context of this article this is what makes them vulnerable to *disciplinary inbreeding*[22]; which, is combined with logical inbreeding may amplify and accelerate the intellectual inbreeding process, up to the point of producing intellectual deformities as is the case of three Noble Laureates, which monstrosities will be briefly described below, and references will be provided about the social and medical monstrosities that generated because of their intellectual accelerating inbreeding processes.

[21] (Academic Tribes and Territories: Intellectual enquiry and the culture of disciplines , 2001)

[22] In this context we are referring to the second sense of "Academic inbreeding". These sense are as follows
1. *Faculty Recruitment*: the practice of hiring faculty members from within the same academic institution where they received their degrees, potentially limiting diversity of perspectives.
2. *Research and Intellectual Perspectives*: Describes a situation where academic disciplines or research areas become isolated, limiting exposure to diverse ideas and perspectives, which can hinder innovation and intellectual growth.

7. Pragmatic and Intellectual Consequences of Confusing Ends with Means

Not explicitly distinguishing ends from their means is one of the consequences of intra-disciplinary inbreeding. *The knowledge learned in a discipline is a means not an end in itself*, especially in professional careers, though it is also an implicit or explicit means in scientific activities. The negative effects of intra-disciplinary inbreeding may have disastrous results in both: scientific or interpretation activities, as we will see in some examples below, and a waste of time and resources in professional activities besides the risk of dangerous wrong decisions, based just on intra-disciplinary perceptions and conceptions.

In other words, not distinguishing between means and their end might be disastrous at the pragmatic level, in general, and not just in the case of design-centered professional and Research and Development activities. Let us note two famous quotes regarding this issue; one is made by a much-known physicist and another by a reputable and well-known humanist (moral and social philosopher)

> *"Perfection of means and confusion of goals seems, in my opinion, to characterize our age."* Albert Einstein, (Out of My Later Years, 1950). Ch. 34.
>
> *"Given the means, we hang on to them and often forget the ends."* Eric Hoffer (Reflections on the Human Condition, 2006)

The first phrase of Einstein is clearly related, among other things, to ***disciplines are means not ends in themselves.*** It relates or is relatable to the notion that disciplines or skills are means to an end, not ends in themselves. The danger is that we can become so enamored with mastering the means - the tools, processes, and methods - that we forget to step back and critically examine whether those means are actually aligned with our higher-level goals and values as individuals and as a society. This quote also points to a need for greater clarity of purpose and a re-alignment of our efforts and capabilities with our fundamental aims and aspirations. Without this, we risk becoming trapped in a cycle of constantly improving our means without a clear

sense of where we are ultimately trying to go, This, evidently, lowers individual and collective diversification and, thus individual and social adaptability. Once again we would like ***to intentionally reiterate*** that this is what disciplinary inbreeding is about.

The second quote: *"Given the means, we hang on to them and often forget the ends."* Eric Hoffer (Reflections on the Human Condition, 2006) also clearly relates to the notion that "disciplines are means not ends in themselves". The notion that Hoffer is communicating is that when individuals or groups acquire certain skills, methods, or disciplines, they can become overly focused on mastering those means rather than keeping sight of the ultimate goals or ends they are meant to serve. This can lead to a situation where the disciplines themselves become the priority, rather than using them effectively to achieve broader objectives. Hoffer's observation cautions against this tendency, emphasizing the importance of maintaining perspective and ensuring that disciplinary pursuits remain aligned with larger aims, rather than becoming ends in themselves.

7.1. A Case in Ethology: Nobel Laureate (in Physiology or Medicine) Konrad Zacharias Lorenz

Hoffer's caution serves as a reminder to maintain perspective and ensure that disciplinary pursuits remain aligned with larger aims. It underscores the importance of keeping sight of the ultimate goals or ends, using disciplines judiciously to advance towards those objectives, rather than allowing them to become ends in themselves. This perspective encourages a more balanced approach, where disciplines are valued for their contribution to larger goals and objectives, rather than being pursued for their own sake. This may not be achieved by taking disciplines as an end in themselves. This is one of the most frequent and dangerous sources of horrendous mistakes as those made by disciplinarians like the above mentioned, in the first section. Nobel Laureate (in Physiology or Medicine) Konrad Zacharias Lorenz referred, to, other human beings as "***moral imbeciles***" just because they are from other races, is this case an example of the intellectual

deformation that disciplinary inbreeding may generate, and the more brilliant is the disciplinarian the major is the intellectual deformity? Some may provide a counter-argument saying that Konrad Zacharias Lorenz was immersed in a social context that helped in getting his intellect in this direction. Why him and no other scientist or eugenicist of his time? Is there any other reason not related to his brilliant intellect that produced such a huge intellectual deformation? Is he a product of disciplinary inbreeding? Or, did he contribute to the inbreeding of the disciple of eugenics? Is he part of the cause and part of the effect; and because of his brilliant but not diversified intellect his intellectual deformities were larger than the deformities average of his time? I will leave these questions to the reader to suggest some answers to her/himself.

Prompting several Language Model AI, the following texts were part of the answers:

> "Your reflection raises important questions about the ***relationship between disciplinary inbreeding, intellectual deformation***, and the actions or beliefs of individuals within specific disciplines.
> ***Konrad Zacharias Lorenz's case provides an example of how disciplinary inbreeding***, combined with other factors such as societal context and individual biases, can contribute to ***intellectual deformation***
> …
> It's worth considering whether Lorenz's immersion in a disciplinary framework that emphasized biological determinism and hierarchical thinking contributed to the development and reinforcement of his prejudiced beliefs…
>
> ….., it's clear that ***disciplinary inbreeding***, combined with societal influences and individual biases, played a significant role. His case serves as a reminder of the importance of critical thinking, openness to diverse perspectives, and ethical considerations within academic disciplines. It also underscores the potential dangers of ***intellectual deformation*** when disciplinary expertise is not balanced with moral and social awareness" ChatGPT [Italics and emphasis added]
> ---
>
> "***The case of Nobel Laureate Konrad Lorenz appears to be an example of the intellectual deformation that can result from disciplinary inbreeding and an overemphasis on the means rather than the ends***.
> ……The counter-argument that Lorenz was simply a product of the social context of his time does not fully explain the extreme nature of his views and the ***intellectual deformities they exhibited***. …….

It is possible that Lorenz's ***disciplinary inbreeding*** *and lack of* ***intellectual diversity*** contributed to the development of his extreme views….

In this sense, ***Lorenz may have been both a cause and an effect of the inbreeding*** within the discipline of eugenics, with his own ***intellectual deformities*** *serving as an extreme example of* ***the dangers of prioritizing disciplinary means over broader ends***. The more brilliant the disciplinarian, the more severe the potential for *intellectual deformation when disciplines become ends in themselves rather than tools for advancing larger goals.* Perplexity: based on explicit references [Italics and emphasis added]

"The passage raises a very interesting point about the potential pitfalls of disciplinary focus. Here's a breakdown of the key points:

- ***…..When disciplines become ends in themselves, it's easy to lose sight of the bigger picture. This can be dangerous, as exemplified by the "disciplinarians" who made horrendous mistakes.***
- **---** The author presents Lorenz, who called people of other races "moral imbeciles," as an example of how a brilliant mind can be ***intellectually deformed*** by a narrow focus….." Bard/Gemini references [Italics and emphasis added]

7.2. A Case in the Field of Economics: *Are Scholarly Elites Means or Ends*

In the field of Economics, as another example, Michael A. Bernstein in (Reconstructing a public economics: markets, states, and societies, 2018) affirmed that:

> "It has been a conviction of those who study the history of the sciences that moribund intellectual traditions may only be overcome by the effective articulation of alternatives. …. [but] A select group at leading colleges and universities continued to wield enormous influence over the distribution of research grants their own ranks replenished from a hiring process disproportionately focused on the graduates of a small number of highly regarded training programs, including their own. Any examination of publication practices in the field would demonstrate as well that the dissemination of research results remained powerfully concentrated in the hands of an elite few. It is a striking yet hardly surprising finding that, at the height of the economic instability occasioned by the Vietnam War, the

> OPEC oil price shocks, and the downward trends in productivity enhancement experienced throughout the 1970s, alumni of only seven graduate programs in the discipline authored well over half the scholarly articles published in the nation's three leading economics journals. ***Such disciplinary inbreeding was hardly conducive to the elaboration of alternative paradigms***" (Bernstein, 2018) [Italics and emphasis added]

Are Scholarly Elites Means or Ends: Some might argue that scholarly elites are means to an end, where the goal is the advancement of knowledge, innovation, and societal progress. In this view, scholarly elites serve as a means to achieve a higher purpose, such as the betterment of society, the economy, or the overall well-being of humanity. On the other hand, others may argue that scholarly elites are ends in themselves, with the pursuit of knowledge and academic excellence being valuable for its own sake. This perspective suggests that the intrinsic value of intellectual pursuits and the development of a highly educated and knowledgeable society are goals worth pursuing independently of any external objectives. We suggest that Scholarly elites should be means for the Academy, Society at Large, and its Common Good. For those who may have accepted reasoning to disagree with our suggestion, then a more nuanced perspective may be suggested, where scholarly elites are both means and ends in a dynamic interaction. In this case, the Final End should always be the Common Good or the Society at Large which implicitly and explicitly supports the Academy with the required financial and human resources.

In the context of elite theory, scholarly elites are a subgroup of intellectual elites, who, along with governmental, corporate, military, media, and government elites, hold a disproportionate amount of power, privilege, and influence, which may reduce the required Requisite Variety to be able to adapt to the changing environment. The more these elites are in the process of being closed systems the more their possibility of ***Elite inbreeding*** with undesirable consequences.

To lower the probability of Elite Inbreeding, it is recommended to foster inter- and trans-disciplinary communication; to have rules and procedures to increase the elite

diversity; to address the issue of an adequate rotation in leadership positions; and potentially create an independent committee where new rules and procedures may be approved in order to ***increase the probability of avoiding a potential Elite Inbreeding.***

7.3. Disciplinary Inbreeding in one Domain May Generate, Impact, or even Interact with Disciplinary Inbreeding in another Domain.

Taking discipline as an end in itself may lead to disciplinary inbreeding that can impact or interact with similar issues in other domains. For instance, consider the Humphries/Miyoshi controversy in literature, which spilled over into the field of Political Science.

This vitriolic debate, involving scholars Donald Humphries and Masao Miyoshi, centered on the merits of postmodernism in literary studies. Humphries, a conservative critic, argued that postmodernism weakens scholarship by prioritizing subjective interpretations over the actual text. Conversely, Miyoshi, a prominent postmodernist, defended the approach as valuable for analyzing power dynamics and identity in literature.

This heated debate generated another in the field of Political Science, which was addressed by William H. Thornton (2002)[23] as the vitriolic Humphries/Miyoshi controversy[24], was presented by William H. Thornton (2002)[25] as a result of ***"disciplinary inbreeding".*** He affirms that "In its peevish excesses, the Humphries/Miyoshi exchange testifies to what comes from ***years of disciplinary inbreeding.*** Japanese culture is too integral to Japanese politics, and the latter is too

[23] (Fire on the Rim: The Cultural Dynamics of East/West Power Politics (Pacific Formations: Global Relations in Asian and Pacific Perspectives, 2002)

[24] This was a very heated controversy. An example can be found in the way how Miyoshi accuses Humphries/ of being "malicious, ignorant, inaccurate, irresponsible, dishonest, fraudulent, lazy, sloppy, unhistorical, and incompetent." Cited by (Thornton, 2002, p. 63)

[25] (Fire on the Rim: The Cultural Dynamics of East/West Power Politics (Pacific Formations: Global Relations in Asian and Pacific Perspectives, 2002)

crucial to the balance of power in Asia, to be left to academic Japanologists alone. What is sorely needed is more, not less, ***interdisciplinary intrusion***." (p. 64) [Italics and emphasis added]. It should be noted that, in our opinion, the combination, in this case of disciplinary and national cultures amplified the problem.

Their disagreement reflects broader tensions within literary studies regarding postmodernism's role and future direction. Interestingly, this heated debate also reverberated in Political Science, as highlighted by William H. Thornton . Thornton sees the Humphries/Miyoshi controversy as a consequence of disciplinary inbreeding in Political Science, exacerbated by similar issues in literature.

According to Thornton, disciplinary specialization has led to insular academic communities, particularly in the subfield of Japanese politics. This insularity hampers interdisciplinary engagement and overlooks the broader cultural and geopolitical dynamics at play. Thornton advocates for greater interdisciplinary collaboration to address such complex issues effectively.

In essence, the Humphries/Miyoshi controversy serves as a warning against disciplinary insularity and the importance of embracing interdisciplinary approaches in both literature and Political Science. By fostering cross-disciplinary dialogue, scholars can gain new perspectives and overcome the limitations of disciplinary inbreeding.

Taking discipline as an end in itself may generate the kind of disciplinary inbreeding that may generate, impact, or even interact with disciplinary inbreeding in another domain. Let us show briefly, as an example, a case in Literature. as related to Political Science.

The vitriolic Humphries/Miyoshi controversy that some call "debate" ***was*** between two academics, Donald Humphries and Masao Miyoshi, over the value of postmodernism in literary studies.

Humphries, a conservative critic, argued postmodernism weakens scholarship by focusing on subjective interpretations and deconstruction over the actual text; while Miyoshi, a prominent postmodernist, defends the approach as valuable for analyzing power dynamics, identity, and the fluidity of meaning in literature.
Their heated disagreement highlights a larger debate within literary studies about the role of postmodernism and the future direction of the field. The author emphasizes the importance of respectful discussion and open dialogue even in the face of strong disagreements.

Since then. the Humphries/Miyoshi controversy serves as a cautionary example and not just in Political Science. It highlights the ***potential pitfalls of disciplinary inbreeding*** and the need for a more interdisciplinary or, better, trans-disciplinary communication and, potentially a holistic approach to understanding complex political and non-political issues, especially those with significant international implications, especially when combined with cultural semiotic systems. This case emphasizes the importance of integrating diverse perspectives and methodologies to enrich scholarly analyses and foster a more comprehensive understanding of political phenomena.[vi]

The Humphries/Miyoshi controversy appears to have had a notable impact on the academic community, stimulating discussions and reflections on the nature of academic discourse, the direction of scholarly work in Japanese studies, and the importance of interdisciplinary approaches in addressing complex issues within the field of Japanese studies. *It may be suggested that this controversy due to intra-disciplinary inbreeding, paradoxically opened up both academic cultures to each other thanks to the controversy.*

8. Extreme Examples of Intra-Disciplinary Inbreeding

Let us present other extreme cases, different from the already presented case of the Nobel Laureate Konrad Zacharias Lorenz's Ethology Inbreeding.

The following cases are also related to 1) taking means (e.g., disciplines) as ends in themselves and/or 2) semiotic systems with low internal variety or diversity.

The field of Behavior, including psychology and Biology, is among those in which we can find the more understandable examples of *"intellectual deformities"* that intra-disciplinary inbreeding may generate. These examples are most visible and, in our opinion, are explicit examples of what implicitly might be generated, or are already being generated, in several, if not in many, disciplines. In the following paragraphs of this section, we will use the highly recommended and referenced New York Times bestseller book, by Robert M. Saposlky (Behave: The Biology of Humans at our Best and our Worst, 2017)

Let us start with the first example that Saposlky presents from well-known scientists.

John B. Watson's behaviorism:

> "Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I'll guarantee to take anyone at random and train him to become any type of specialist I might select– doctor, lawyer, artist, merchant-chief and yes, even beggar-man, regardless of his talents, penchants, tendencies, vocations, and race of his ancestors." (Watson, 1930); quoted by (Saposlky, 2017, p. 8)

The author of the above quote was ranked by A *Review of General Psychology* survey as the 17th most cited psychologist of the 20th century (Haggbloom, et al., 2002). Yes, we are referring to Columbia University's Professor John B. Watson, who established the psychological school of behaviorism and was also the Editor of the prestigious *Psychological Review. He wrote this quote in his well-known book*

(Behaviorism, 1930)[26]. In our opinion, this is an example of the many problems with some "isms". They are a fertile intellectual platform for the generation of disciplinary inbreeding which potentiates intellectual deformities like the ones we have mentioned above.

This is why we suggest taking care about any kind of "-ism" in order to allow plural perspectives in the context of perspectival epistemology[27], [vii] Paraphrasing B. H. Kelly (1988))[28], we might probably say "no-ism, but pluralism" or "no-ism, but perspectivism", but we prefer not to use the "-ism", not even in this way. From a plural perspective, it is suggested to use the terms 'plural', "plurality of perspectives", etc. When we use the postfix "-ism", we would be referring to an intellectual movement or conception known with this postfix." We think that following this suggestion while thinking and writing would, probably, lower the probability of falling into the "ism" trap and, hence, fertilizing the intellectual terrain for possible intra-disciplinary (or intra-intellectual-movement) inbreeding.
According to Sapolsky (Behave: The Biology of Humans at our Best and our Worst, 2017), "Watson was pathologically caught inside a bucket having to do with the environmental influence on development". He was inside the sub-sub-discipline he created in the context of the sub-discipline of experimental psychology in which knowledge inferred from experiments with animals was transferred to the knowledge domain of the discipline of human beings' psychology. This kind of "*peripherical intellectual blindness"*[29] *and or "intellectual myopia"*[30] might be

[26] Referenced by (Saposlky, 2017, p. 721) and cited by the same author (2017, p. 8)
[27] Perspectival epistemology refers to a philosophical approach that emphasizes the role of perspective or viewpoint in the acquisition and justification of knowledge. In this framework, knowledge is understood to be inherently situated within specific perspectives or contexts, and different perspectives may lead to different understandings of truth or reality.
[28]Referenced in Samuel Claude Shepherd (2001)
[29] Peripheral vision is important for motion processing, orientation, and expanding the field of vision. "Intellectual peripheral blindness" is a metaphorical term used to describe lack of lateral intellectual. Again metaphorically, it has the effects of horses' "blinder" or "blinkers" that are attached to restrict its vision and prevent it from seeing to the side or behind. . "Intellectual peripheral blindness" impede intellectually seeing what is happening, changing (metaphorically moving) in other disciplines.
[30] The metaphor "intellectual myopia" is used to describe a cognitive condition where an individual or a group displays a limited or short-sighted perspective within the realm of intellectual pursuits; which may happen in focusing a large time on one disciplines, or, worst, one sub-disciplines. Inter- and/or trans-

dangerous because of the sub-sub-disciplinary incest it might create. “Acute bilateral blindness is an emergent condition that may signal life-threatening disease” (Hoovel & Stack, 1996). Metaphorically, Intellectual peripherical blindness may be a life-threatening disease to the intellect with contagious consequences to other academics in the same discipline and, which is worse, to the students of the respective professor or lecturer. ***Interdisciplinary*** *research, education, and communication might be a kind of vaccine against this intellectual disease, which is a product of intra-disciplinary inbreeding.*

Nobel Prize in Physiology or Medicine in 1949, Egas Moniz’s Psychosurgery

> “Normal psychic life depends upon the good functioning of brain synapses, and mental disorders appear as a result of synaptic derangements … It is necessary to alter these synaptic adjustments and change the paths chosen by the impulses in their constant passage as to modify the corresponding ideas and force thought into different channels.” (Egas Moniz, awarded the Nobel Prize in 1949): Cerebral angiography and prefrontal leucotomy. Quoted by (Saposlky, 2017, p. 9):

Is it *necessary* to alter these synaptic adjustments? Really? Does that make any cognitive or ethical sense? Should we reduce psychiatry, psychology, cognition, etc. to neurology or, worse, to neurosurgery? Does this make any sense to any intellectual? It seems that it made complete sense to Nobel Laureate Edgar Moniz, who, according to Zbigniew Kotowicz (Gottlieb Burckhardt and Egas Moniz - two beginnings of psychosurgery., 2005) coined the term “Psycho-Surgery”. This neologism, that he created, may even be considered a ‘*contradictio in terminis’,* a contradiction in terms, a combination of two words whose meanings conflict with each other, and/or an idea that embodies a contradiction. It is not surprising that the term fell from grace. Walter Freeman, who popularized Psychosurgery in the USA, was, in 1960, banned from ever operating again, because of the disasters he was

disciplinary .communication, education, and/or research are among the best vaccines against “intellectual myopia" as well as against "Intellectual peripheral blindness"

causing with his frenetic activities using his technique of transorbital or 'ice pick' lobotomy (i.e., hammering an instrument similar to an ice pick into a patient's brain through their eye sockets). Edgar Moniz, who was nominated for the Nobel Prize by Walter Freeman, also fell in disgrace. In 2005 there was "an effort by the families of lobotomy patients to persuade the Nobel Prize committee to rescind the award that was given to Moniz", as informed by Edgar Weiner (Nobel Panel Urged to Rescind Prize for Lobotomies, 2005)

The above example is a very good one for showing how harmful and dangerous may potentially be:

1. To use composed and wrong names, because it might unconsciously confuse the whole with one of its parts or the genre with the species. Referring to neuro-surgery with the name of neuro-psychology:

    a. *is a huge* ***logical error*** *(even a mistake) in predicate logic*, because it confuses the genre with the species, which is a logical fallacy as Aristotle showed it to the Sophists of his time,
    b. *reduces the whole to some of its parts, and/or*
    c. ***confuses means with ends or –worse- takes the means as an end in itself***; which is a *logical perversion or an intellectual corruption in the context of End-Means Logic*, as we detailed above. This is because neural nets are part of the brain or the mind, but the way they function depends on other biological components, for example, the production of hormones; which, in turn, depends on other biological processes. So, the brain's functioning does not depend just on its neural connections. It does not make any sense to reduce the biology of the brain, (organically related to the rest of the body) to just its internal connections; let alone reduce the psychic mind to the brain's neural nets. This is a usual and unfortunate consequence of reductionism, in general, and its potential *intra-disciplinary inbreeding*. This is the cause and/or effect of disciplinarians with intra-disciplinary inbreeding, hence, with impaired intellectual peripheral vision. Disciplines are partial

descriptions of reality which is a whole. Consequently, *each disciplinarian should have; at least, a layperson's knowledge of the disciplines related to her/his.* ***This is why inter- and/or trans-disciplinary communication is so ethically, intellectually, and pragmatically important****, and this is why disciplinarity, interdisciplinarity, and even non-disciplinarity (Stakeholders) should have two-way relations. in order to avoid extreme reductionisms and their potential disciplinary inbreeding. Consequently, why no more academic and scientific efforts are being made to increase awareness regarding this issue?*

2. To focus on just one discipline or –worse– on one sub-discipline. This may increase the probability of atrophying the intellectual peripherical vision or, even, getting blindsided regarding other disciplines that impact and are impacted by the one-dimensional disciplinary approach. This may certainly impact negatively the nature of human beings as individuals and as a society, in which problems, values, and objectives require multi, inter-, and/or trans-disciplinary intellectual perspectives. Intra-disciplinary academic inbreeding may, certainly, be more harmful than any other kind of academic inbreeding.

Returning to the notion of psycho-surgery, some authors (e.g. (Stone, 2008)) claim that psycho-surgery re-emerged with the new name “neuro-surgery”, This is not just a change in name in our opinion, but, naming things by their proper and correct names, which immensely helps in avoiding the conceptual confusions and the (mostly unintentional) logical errors, mistakes, and even logical corruption and perversions, that we briefly described in the point above. With regards to the model most followed (at least in the USA, e.g., The Massachusetts General Hospital) is mandatory to have a) “careful interdisciplinary screening” (Stone, 2008) by, at least, “psychiatrists, neurologists, and neurosurgeons” and b) and informed consent by the patient. Massachusetts General Hospital, for example, “involves the family in the informed consent process, but it is the patient who must provide the formal written consent” (Stone, 2008). An increasing number of scientists and medical doctors emphasize the necessity of consulting sources external to the organization that made

the interdisciplinary screening. Even the United Nations Convention conceives the review of an "independent external body" as a necessary condition for this kind of treatment and with regards to the validity of the informed consent (United Nations., 1991, p. 96)[31]. With regards to the external review, Alan A. Stone affirms that "Despite the interdisciplinary participation of psychiatrists, neurologists, and neurosurgeons, if they function within one hospital, there exist well-known psychological constraints and pressures for conformity." (Stone, 2008). In our opinion, this external review would avoid not just organizational and economic interest to determine the kind of procedure to follow in such a multi-dimensional and multi-disciplinary problem, but also what we might call *"organizational or Institutional inbreeding"* in potentially dangerous and, hence, unethical treatment. This institutional inbreeding is analogous to the much-known academic inbreeding that might be produced by students who graduated from the same university to end up teaching in the same university in which they got their last degree or all their degrees; which would be worse.

Let us now present the third example provided by Robert M. Saposlky (2017, pp. 9-10):\

Nobel Laureate Konrad Zacharias Lorenz's Ethology

This is an intentional reiteration of the case related to the many texts Nobel Laureate Konrad Zacharias Lorenz wrote. He refers to non-Germanic races as ***"moral imbeciles"***. Couldn't he notice how ***"immoral imbecility"*** is what he wrote? ***Is there a more adequate example of the intellectual monsters that intra-disciplinary incest may generate***? Is there any better example than this quote, written by Lorenz, as a conclusion inferred from applying, with intellectual blindsiding, the discipline of animal behavior, and a wrongly understood Darwinian evolution, to human beings' races and, specifically, those with no Germanic descent?

[31] Adopted by General Assembly Resolution 46/119 of 17, December 1991

Konrad Lorenz is among the more effective examples of the dangers associated with intellectual insularity. His remarks demonstrate a profound misunderstanding of human diversity and the complexities of social behavior, resorting to harmful stereotypes and labels based on race. This case underscores how disciplinary inbreeding, tunnel vision, and disciplinary myopic perception can lead even highly respected and brilliant intellectuals to espouse prejudiced and morally reprehensible views. Lorenz's status as a Nobel laureate does not excuse or mitigate the harm caused by his discriminatory beliefs. While there may be other examples of intellectual figures whose expertise in one area led them to make unfounded assertions in another, Lorenz's remarks serve as a poignant reminder of the ethical responsibilities that accompany academic pursuits, i.e., *not to take disciplines as ends in themselves but means for Personal and Common Goods.*

It, also, highlights the need for disciplinary scholars to critically examine their assumptions and biases, to know about other disciplinary and inter-disciplinary perspectives, and to approach their topics with intellectual humility, human sensitivity, and respect for other disciplinary perspectives and human dignity. This is the main purpose of reiterating this case, in this article, three times in three different contexts.

In 2015, the Austrian University of Salzburg "posthumously stripped Nobel Prize-winning scientist Konrad Lorenz of his honorary doctorate due to his fervent embrace of Nazism" (US-News, 2015), isn't that too little and too late, especially because he was granted the Nobel Prize in 1973? "This decision was made after his membership in the Nazi party was confirmed … US-News."[viii] So, could we infer that Konrad Lorenz was stripped of his honorary doctorate because he *lied* for a long time and not because of conceiving human behavior as reduced to other animal behavior, from a one-dimensional and distorting intra-disciplinary perspectives that moved him to one of the most racist attitudes, which supported the Nazi regime in justifying its crimes and genocides? Reading for the second time the quote above,

any reader can notice the justification of genocide. Let us repeat: the above quote is just one of the many pages he wrote justifying Nazism and genocide.

In no way, I am trying to demerit Lorenz's work or implying that it should not be read. I am not suggesting that every Nazi scientist has no merit and should not have the right to redemption. Neither am I saying that Lorenz was not a great scientist and probably among the best in the past century. On the contrary, what I am trying to convey is what Robert M. Saposlky (2017) tried to communicate: ***Even great thinkers and among the best may also suffer the intellectual deformities that may emerge as a consequence of intra-disciplinary inbreeding or incest,*** *as those of the other brilliant two extreme examples given above, along with many other example**s.*** *The consequences of extrapolating from one discipline to others, without a minimum of interdisciplinary communication and, hence, knowledge might create intellectual deformities and even intellectual monsters.* ***The intention here is to show that even brilliant scientists may be negatively affected by disciplinary inbreeding.***

Robert M. Saposlky (2017), also had this intention with his book. For example, one of the conclusions that he made, after presenting three examples (among those mentioned above and many others that might be presented) is that these examples

> "[w]ere not obscure scientists producing fifth-rate science at Podunk U. These were among the most influential scientists of the twentieth century. ***They helped shape who and how we educate*** and our views on what social ills are fixable and when we shouldn't bother. They enabled the destruction of the brain of people against their will. And they helped implement final solutions to problems that did not exist. *It can be more than a mere academic matter when a scientist thinks that human behavior can be explained from **only one perspective***" or discipline. (Saposlky, 2017, p. 10) [Italics and emphasis added].

9. Is Disciplinary Inbreeding a Multi-Disciplinary Phenomena?

"Disciplinary inbreeding" is indeed a phenomenon that can occur across different disciplines simultaneously, so it may be considered a multi-disciplinary phenomenon. One of the causes of this situation may be related to “having a multidisciplinary background tends to challenge favorable academic placements and upward mobility. However … and those who have graduated from the same institution where they work (academic inbreeding) are better at overcoming these challenges.” (Lyu, Huang, & ' Liu, 2024)

What may add to this proliferation of disciplinary inbreeding phenomena is “the emergence of multiple disciplines and the exponential development of specialist knowledge…[and] The application of free-market ideologies to the higher education sector in the 1990s has positioned academic disciplines in competition with each other for resources…. Many academics have internalised the pressure to police disciplinary boundaries, and keep their heads down and in their faculties” (Abrams, The Conversation, 2015)

So, it seems evident that fostering interdisciplinary collaboration and trans-disciplinary education and communication, along with ethical considerations and diverse perspectives in contemporary scientific endeavors, is a must for preventing the negative consequences associated with such insularity or, worse, archipelagos, isolated from their exterior scientific and societal environment. Examples of the latter include stakeholders, which are a necessary but not sufficient condition in any transdisciplinary research, especially in the field of Trans-disciplinarity.

An example of Multi-Disciplinary Inbreeding was the Eugenics movement, where the scientists and scholars involved were, at least, from the areas of heredity, genetics, and human traits, more specifically from the following disciplines: Genetics, Anthropology; Psychology; Medicine; Social Sciences; Statistics; Public Health, etc. We also have to take into account that each of these areas may have had several disciplines and sub-disciplines. This may create the hypothesis that 1) intra-

disciplinary inbreeding affected all these areas separately while influencing each other via positive feedback, while regulatory negative feedback came from the outside. In this case, we have a complex system; sub-systems were feeding positively, reinforcing each other, while no negative (regulative) feedback was coming from the exterior because of the insularity of each discipline, each of which is part of an archipelago of related islands but not related to the exterior of them. This kind of complex multi-disciplinarity is what made the life of the Eugenics movement longer and its negative effect on Society at Large greater, much greater. This would be even more complex if we take into account the involved political ideologies, which, by definition, are intentionally isolated as much as their leaders, speakers, and writers can.

Works Cited

Abrams, J. (2015, July 31). *The Conversation*. Retrieved 4 8, 2024, from How to value research that crosses more than one discipline: https://theconversation.com/how-to-value-research-that-crosses-more-than-one-discipline-45324

Abrams, J. (2015, July 31). *The Conversation*. Retrieved 4 8, 2024, from How to value research that crosses more than one discipline: https://theconversation.com/how-to-value-research-that-crosses-more-than-one-discipline-45324

Ashby, W. R. (1956). *An Introduction to Cybernetics.* London, United Kingdom: Chapman & Hall,. Retrieved 8 31, 2019, from http://pespmc1.vub.ac.be/books/IntroCyb.pdf

Becher, T., & Trowler, P. R. (2001). *Academic Tribes and Territories: Intellectual enquiry and the culture of disciplines.* The Society for Research into Higher Education & Open University Free Press.

Bennett, D. h.-s.-p. (2009). *Positivism/Positivist Geography*. (Encyclopedia of Human Geography,) Retrieved 11 18, 2023, from International ScienceDirect, Elsevier. : https://www.sciencedirect.com/topics/social-sciences/logical-positivism

Bernstein, M. A. (2018). Reconstructing a public economics: markets, states, and societies. *Real-World Economics Review,*(84). Retrieved 11 21, 2023, from http://www.paecon.net/PAEReview/issue84/Bernstein84.pdf

Callaos, N. (2020). The Notion of Intellectual Rigor: A Systemic/Cybernetic Approach. (N. Callaos, H.-W. Chu, J. Horne, & T. Marlowe, Eds.) *Journal of Systemics, Cybernetics And Informatics, 18*(1), 99-133. Retrieved 7 1, 2023, from www.iiisci.org/journal/CV$/sci/pdfs/IP105LL20.pdf

Callaos, N. (2020, 3 2). The Notion of Intellectual Rigor: A Systemic/Cybernetic Approach. (H.-W. C. Nagib Callaos, Ed.) Retrieved 3 5, 2020, from Journal of Systemics, Cybernetics, and Informatics (JSCI): https://www.iiis.org/nagib-callaos/Intellectual-Rigor

Callaos, N. (2021). Fostering Inter-Disciplinary Communication (FIC). *Journal of Systemics, Cybernetics, and Informatics (JSCI), 19*(1), 1-37. Retrieved 11 23, 2023, from https://www.iiisci.org/journal/PDV/sci/pdfs/IP117LL21.pdf

Callaos, N. (2022). *Intellectual Development via Trans-Disciplinary Communication.* Retrieved 5 30, 2022, from ResearchGate: https://www.researchgate.net/publication/360375603_Intellectual_Development_via_Trans-disciplinary_Communication

Callaos, N., & Marlowe, T. (2020). Interdisciplinary Communication Rigor. (N. Callaos, & M. Thomas, Eds.) *Journal of Systemics. Cybernetics, and Informatics, 18*(1), 6-29. Retrieved 9 3, 2022, from https://www.iiisci.org/journal/sci/FullText.asp?var=&id=IP086LL20

Cohen, E., & Lloyd, S. (2014). Disciplinary evolution and the rise of the transdiscipline. (T. G. Gil, Ed.) *Informing Science - The International Journal of an Emerging Transdiscipline, 17*, 189-215. Retrieved 4 8, 2024, from https://www.inform.nu/Articles/Vol17/ISJv17p189-215Cohen0702.pdf

Hofstede, G. (1994). Foreword. In K. Uichol, H. C. Triandis, & C. Kagitcibasi (Eds.), *Individualism and collectivism. Theory, methods, and applications* (pp. ix-xiii). New York: Sage Publications.

Kelly, B. H. (1988)). No Ism but Bibleism": Biblical Studies at Union Theological Seminary in Virginia. *American Presbyterian, 66* (2), pp. 105-114.

Kotowicz, Z. (2005). Gottlieb Burckhardt and Egas Moniz - two beginnings of psychosurgery. *Gesnerus (The official journal of the Swiss Society of the History of Medicine and Sciences), 62*(1-2), 77–101.

Kraut, R. E. (2003). Applying Social Psychological Theory To The Problems Of Group Work. In J. Carroll (Ed.), *HCI Models, Theories, and Frameworks: Toward a Multidisciplinary Science* (pp. 325-356). New York, NY, EUA: Morgan-Kaufmann Publishers Morgan KaufmannEditors. doi:10.1016/B978-155860808-5/50012-5

Lyu, W., Huang, Y., & ' Liu, J. .. (2024, March 01). The multifaceted influence of multidisciplinary background on placement and academic progression of faculty. *Nature - Humanities and Social Sciences Communications, 11-350*. doi:https://doi.org/10.1057/s41599-024-02818-8

Massi. Michela. (2022). *Perspectival Realism.* Oxford, UK: Oxford University Press - Oxford Studies in Philosophy of Science).

Online Etymological Dictionary. (n.d.). Retrieved 8 8, 2019, from https://www.etymonline.com

Pollock, J. L. (2006). The Logical Foundations of Means-End Reasoning. In R. Elio (Ed.), *Common Sense, Reasoning, and Rationality* (pp. 60–77). UK: Oxford Academic - Oxford University Press. doi: https://doi.org/10.1093/0195147669.003.0003

Saposlky, R. M. (2017). *Behave: The Biology of Humans at our Best and our Worst.* New York, New York, USA: Penguin Random House. LC.

Schulte, O. (2001, 11 18). Means-Ends Epistemology. Retrieved 2023, from https://www.cs.sfu.ca/~oschulte/files/pubs/bjps.pdf

Simon, H. A. (1957/2013). *Administrative Behavior: a Study of Decision-Making Processes in Administrative Organization* (4th Revised ed. edition (February 5, 2013) ed.). Detroit, Michigan, USA: Free Press.

Simon, H. A. (1996). *The Sciences of the Artificial (Third Edition).* Massachusetts: The MIT Press.

Stone, A. A. (2008). Psychosurgery—Old and New. *Psychiatric Times, 25*(7).

Thornton, W. H. (2002). *Fire on the Rim: The Cultural Dynamics of East/West Power Politics (Pacific Formations: Global Relations in Asian and Pacific Perspectives.* Rowman & Littlefield Publishers.

Tise, J., Sperling, R., Dann, M., & Young, T. (2023). Teaching Postsecondary Students to Use Analogies as a Cognitive Learning Strategy: An Intervention. *CBE Life Sci Educ. , 22*(1). doi:doi: 10.1187/cbe.22-05-0084.

United Nations. (1991). *United Nations Principles for the Protection of Persons with Mental Illness and for the Improvement of Mental Health Care; Adopted by General Assembly Resolution 46/119 of 17 December 1991. New York.*

US-News. (2015). Austrian university strips Nobel Prize winner Konrad Lorenz of doctorate due to Nazi past Associated Press.

Váry, A., & Vecsenyi, J. (1983). Decision Analysis of Industrial R&D Problems: Pitfalls and Lessons. In P. Humphreys (Ed.), *Analyzing and Aiding Decision Processes (Advances in Psychology* (pp. 183-195). Elsevier Science Ltd.

Watson, J. (1930). *Behaviorism* (2nd ed. ed.). New York, New York: USA: W. W. Norton & Company.

Weiner, E. (2005, August 10). *Nobel Panel Urged to Rescind Prize for Lobotomies*. Retrieved 11 22, 2023, from NPR. Health Care: https://www.npr.org/templates/story/story.php?storyId=4794007

End Notes

[i] While Aristotle is a pivotal figure in the history of logic, subsequent logicians and philosophers have contributed to our understanding of means-ends reasoning. For example **Philipp Melanchthon:**appreciated and worked on Aristotle's logic American pragmatists are strogly based on instrumental thinking and, hence, American Pragmatism strogly enphasixe on practical and instrumental thinking, hence explicitly or implicit on means-ends logic. They even asspciate to to the notion of Truth in its most general sense, as Knowledge Truth. For example the pragmatic maxim introduced by Charles Sanders Peirce, which suggests that the meaning or truth of a concept or notio lies in its practical consequences, acknowledges the importance of *means in relation to ends*. Other pragmatist philosophers like William James and John Dewey also emphasized the practical consequences of beliefs and actions, as well as the instrumental nature of knowledge and *the need to integrate means with ends* to address problems effectively. The overall theme is the pragmatist philosophers' focus on the means-end relationship in their work

[ii] Bounded rationality refers to the idea that rationality is limited, hence restricted, when individuals make decisions, and under these limitations, rational individuals will select a decision that is satisfactory rather than optimal. They may suggest an optimal one via Mathematical Optimization if 1) there is knowledge precise enough and complete data related to the decision as a whole, 2) time that would make feasible the mathematical modelling (Which validation verification Cycle are not previously known), and 3) a two-ways translator between the mathematical model and its results with the decision maker(s). We have direct experience why this process may by a lengthy one where real-life restrictions may not allow it to continue and, hence, the decision maker(s) may take the most satisfying solution gotten in the reiterative cycle of iterative mathematical optimization and the try to make it as feasible as possible while suboptimizing it. All of this will be done in the context of the Bounded Rationality of the decision maker(s)

Having inserted the above summary to Perplexity AI, the following feedback was given, which enlarges the context of the notion "Bounded Rationality" and, hence, enhances its meaning:

> "Bounded rationality refers to the idea that rationality is limited when individuals make decisions, and under these limitations, rational individuals will select a decision that is satisfactory rather than optimal. This concept addresses the discrepancy between the assumed perfect rationality of human behavior, which is utilized by other economic theories, and the reality of human cognition. Bounded rationality recognizes that perfectly rational decisions are often not feasible in practice due to the intractability of natural decision problems and the finite computational resources available for making them. It revises notions of "perfect" rationality to account for the limitations in decision-making, including the intractability of natural decision problems and the finite computational resources available for making decisions. Bounded rationality has wide applications in various disciplines, including political science, economics, psychology, law, and cognitive science. It was coined by Herbert A. Simon as an alternative basis for the mathematical and neoclassical economic modeling of decision-making, as used in economics, political science, and related disciplines. Bounded rationality describes the way that humans make decisions that depart from perfect economic rationality due to limitations in mental capacity, available information, and time. Instead of striving to make the "best" choices, individuals often settle for making satisfactory choices." Perplexity AI

[iii] The concept of teleology, derived from the Greek words: "telos" (end, purpose, or goal) and "logos" (explanation or reason), plays a fundamental role in the framework of the Systems

Approach and Decision Making. Teleology is concerned with delving into the inherent purpose, goals, and intended outcomes that define systems. Emphasizing the goal-oriented nature of systems, teleology provides a lens through which we can comprehend the essence of systems and their functioning. On the other hand, Decision Making is explicitly or implicitly related to Systems Design, Implementation, and its Usage, which may also support Decision Making, especially, but not exclusively, in the case of Decision Support Systems.

Within the Systems Approach, teleology extends its influence beyond mere observation and analysis; actually both Systems Analysis and Synthesis (design, implementation, and relationships with its environment, including its end users) require many decision-making processes before, during, and after their design, implementation, implementation, use, and maintenance. So, it is easy to notice that it becomes a guiding principle for decision-making processes. By scrutinizing the purpose and goals of a system, decision-makers gain valuable insights that inform and shape their choices. This deliberate alignment of decisions with the overarching objectives enhances their efficacy in steering a system toward success and the intended outcomes originally set forth.

Furthermore, by constantly referencing the teleological aspect, decision-makers can maintain: 1) a holistic understanding of the system's raison d'être, allowing them to navigate complexities and make decisions that are inherently purposeful and goal-driven; and 2) a holistic perspective in the life cycle of the systems, since it is conceived and re-conceived by its designers and users, up to its maintenance and replacement, when another holistic process starts along with the system's developments and uses, as well as along all the required decision-making processes. This means that Human Beings' telos is the cause and effect of the associated systems. So, no wonder that, in this sense, the meaning of “Teleology” in the context of the Systems Approach is completely coherent with its meaning in “Decision Making Processes.” It is good to notice that this relationship is a cybernetic one, and being so, there is no wonder why synergies emerge between the respective two meanings along with the associated processes and systems (the physical and the decision-making systems and processes).

The mentioned synergy may even generate a meta-synergy, i.e., the synergies generated by the interaction of the two: 1) physical and 2) decision-making systems with other standalone decision-making systems, automatic physical systems, or hybrid systems.

[iv] It is a truism to note that knowledge and reasoning are intrinsically linked; consequently, it seems evident that means-end reasoning, focused on identifying the means to achieve goals, holds significance for investigations in epistemology. The alignment of means-end logic with epistemology underscores its importance in comprehending how knowledge is attained, validated, and utilized. This connection emphasizes the role of goal-oriented reasoning in shaping the processes of knowledge acquisition and justification within epistemological inquiries.

The examination of means-end relations further underscores the adjustment of the real-world to realize a desired situation*, offering insights into the dynamics of knowledge and truth in epistemology*. Consequently, applying means-end logic in epistemology contributes to the exploration of reasoning processes, knowledge acquisition, and the pursuit of truth within the realm of knowledge theory and philosophy.

It is important to add that the application of "means-end logic" in "epistemology" is significant, particularly in the context of ***Second Order Cybernetic*s**, which emphasizes reflexivity and self-assessment in decision-making processes. Means-end logic, rooted in the examination of purpose, goals, and intended outcomes, aligns with epistemological investigations, which processes are based on explicit and/or implicit epistemological objective and the means to achieve them. This connection underscores the importance of making explicit the respective goal-oriented reasoning and in shaping the processes of knowledge acquisition and justification within epistemological inquiries. Therefore, the application of means-end logic in epistemology contributes to the exploration of reasoning processes, knowledge acquisition, and the pursuit of truth within the realm of knowledge theory and philosophy. This aligns with the need for self-assessment

and reflexivity in decision-making, particularly within the context of Second Order Cybernetics, where observers are encouraged to observe their own thoughts and describe their thinking processes to themselves and the external world. This approach ensures that decision-making processes are aligned with the intended outcomes and reflects the bounded rationality of decision-makers within the context of epistemological inquiries.

[v] "Paraconsistent logic is a type of non-classical logic that challenges the principle of explosion found in classical logic ["From a contradiction, anything follows."]. The principle of explosion asserts that anything follows from a contradiction, leading to the rejection of systems that allow for true contradictions. In contrast, paraconsistent logic allows for the possibility of true contradictions without leading to triviality.

In paraconsistent logic, a contradiction does not entail every possible statement, and some contradictions may be tolerated or selectively accepted. This departure from classical logic's exclusion of contradictions makes paraconsistent logic particularly useful in situations where information may be incomplete or where conflicting pieces of information need to be simultaneously considered without rendering the entire system inconsistent.

One of the key features of paraconsistent logic is its openness to different approaches and the acceptance of contradictions within well-defined contexts. This flexibility allows paraconsistent logic to act as a meta-system, accommodating a variety of logical semiotic systems based on the nature of the problems being addressed." ChatGPT

[vi] "The main points of disagreement between Humphries and Miyoshi revolve around their scholarly exchange, which appears to have been characterized by strong language and accusations. The controversy seems to have stemmed from a clash of perspectives and interpretations within the field of Japanese studies, with *both scholars expressing contrasting views on the nature of academic discourse and the direction of scholarly work in this area*. According to the provided search results, the disagreement between Humphries and Miyoshi involved heated exchanges, with Miyoshi accusing Humphries of various negative attributes such as being "malicious, ignorant, inaccurate, irresponsible, dishonest, fraudulent, lazy, sloppy, unhistorical, and incompetent"……

The disagreement appears to have encompassed issues related to the nature of academic discourse in America, the representation of Japanese studies within the larger academic community of the humanities, and the direction of scholarly work in Japanese studies…
.

In summary, the main points of disagreement between Humphries and Miyoshi appear to revolve around their differing perspectives on the nature of academic discourse, the direction of scholarly work in Japanese studies, and the representation of Japanese studies within the larger academic community of the humanities. The exchange seems to have been marked by strong language and accusations, reflecting a significant scholarly disagreement within the field of Japanese studies." Perplexity AI

[vii] Perspectival Realism, spearheaded by Michela Massimi, (Perspectival Realism, 2022) shifts the focus from metaphysical inquiries about reality to epistemological considerations about how scientists acquire knowledge. It underscores the influence of scientific communities on shaping perspectives and emphasizes the reliability of phenomena supported by evidence.

Massimi posits that scientific models serve as exploratory tools rather than direct reflections of reality, challenging the notion of models as exact representations. She

addresses the apparent contradictions among scientific models by questioning their direct correspondence to reality.

The theory acknowledges the human influence on scientific categories while maintaining the existence of an objective reality beyond human perception. Massimi argues that phenomena exhibit stability and adhere to consistent rules, providing insights into an objective reality accessible through scientific inquiry.

Perspectival Realism offers a thought-provoking perspective on the nature of scientific knowledge, inviting further philosophical exploration without claiming to provide definitive answers. It encourages a reconsideration of scientific understanding and sets the stage for ongoing discourse in the field.

[viii] The Times of Israel, citing The Associated Press on 17 December 2015, 7:12 pm, wrote the following :

> "Nobel Prize-winning Nazi posthumously stripped of doctorate Austrian university says scientist Konrad Lorenz 'spread racist ideology of National Socialism' in his work
>
> The University of Salzburg cited Lorenz's 1938 application for membership in Hitler's Nazi party in its decision made public Thursday.
>
> Lorenz describes himself as "always a National Socialist." He says his work "stands to serve National Socialist thought."
>
> The university said Lorenz spread "basic elements of the racist ideology of National Socialism" in his work.
>
> The late Austrian zoologist, ethologist, and ornithologist was one of three winners of the 1973 Nobel Prize in Physiology or Medicine."