Construction-deconstruction-reconstruction framework: A methodology for interdisciplinary research

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Abstract

Purpose – This article introduces a framework to cope with communication problems within interdisciplinary groups by analyzing theory as a system.

Design/methodology/approach – The analysis starts by defining theory and unfolds to other two concepts, namely systems and complexity.

Findings – By seeing theory as a system, the structural role of disciplines in the constitution of individual researchers can be described. As a system searching for its own self-reproduction, theories – which are constructed by such researchers – become overspecialized. The communication problem then arises from the structure related to the own theory self-reproduction. Consequently it cannot be reduced to individual researchers. In this case, a shared methodology to build transdisciplinary methods and theories is needed. One candidate to build this methodology is proposed in this article.

Research limitations/implications – This is an initial theoretical conceptualization, which needs a broader assessment and case studies.

Practical implications – If the proposed analysis is valid, this implies that teaching researchers to become better communicators is not the solution to improve the communication within interdisciplinary groups. The solution would reside in structural changes on how theories within specific disciplines could be combined and then remapped into a different transdisciplinary domain.

Social implications – This article is a call for change and emancipation. By understanding from where theories come and how they are crystallization of structural relations, researchers can identify themselves and the research they do as a social phenomenon that is also open for interventions.

Originality/value – The value of this contribution is the analysis of theory as a system, which is produced by individual researchers. They, in their turn, are constituted by specific disciplines and hence structural effects become clearer.

Keywords – Interdisciplinary research, Self-reference, Methodology, Systems theory

Paper type – Conceptual paper
1 Introduction

This article is an attempt to cope with challenges arising when research activities are carried out within an interdisciplinary group (i.e. a group composed of researchers trained in different disciplines). While many issues could potentially emerge in such a context (e.g. (Newell, 2001; Youngblood, 2007)), I target only one: the overspecialization process within disciplines that harms the group communication. This may result in isolating subgroups of people with similar background or misunderstanding the goal to be achieved by the project as a whole. An explicit methodology shared across disciplines (i.e. a transdisciplinary methodology) may help in overcoming such a problem, although it may not be sufficient. Due to the characteristics of communication processes, I argue that such a methodology needs to be capable of dealing with reflexivity. Therefore, the methodology also becomes an interdisciplinary problem.

I have found in N. Luhmann’s systems theory (Luhmann, 1995, 2012), E. Morin’s complexity thinking (Morin, 2006; Malaina, 2015), G. P. Shchedrovitsky’s methodological studies (Shchedrovitsky, 1966; Shchedrovitsky and Kotel’nikov, 1988) and L. Althusser’s philosophical position about science (Althusser, 1967) the inspiration – and the first steps – to pursue such a research path. The methodology shall unfold as follows. Theories are constructed within a disciple. Then, they may also be deconstructed in specific ways towards a new reconstruction that fits the totality of the phenomena to be assessed by the interdisciplinary group.

I propose that the operations of deconstruction and reconstruction shall map the phenomena into three layers: (i) a physical layer composed by material things and connections, (ii) an informational layer related to symbolic classifications, relations and exchanges, and (iii) a regulatory layer involving decision-making procedures, rules and relations. In the reconstructed form, the interactions occur between elements of the same layer and across different layers. The phenomena are then constituted of (and not reduced to) these layers. This multi-layer approach was described in similar terms by Midgley (Midgley, 1992) and was also employed in computational, agent-based studies that I co-authored (Kühnlenz and Nardelli, 2016).

As a theory itself, the proposed methodology can also evolve in overspecialized paths. At the same time, because the methodology is also a theory, it can always be assessed in the same way through meta-analysis. The proposed framework then needs to follow its own propositions to indicate the conditions that avoid overspecialized evolutionary paths.

2 Key concepts

Sentences like “this is my theory about (...)”, “the system is unfair” or “the complexity of this issue is too high” are recurrent in many contexts. But, is the meaning intended by the speaker/writer really realized by listener/reader? I expect the answer is, almost always, positive; notwithstanding, when an explicit definition of “theory”, “system” and “complexity” is required, problems may arise. Their definitions tend to be fuzzy and context-dependent; they indicate non-trivial concepts.

As Morin wrote (Alhadeff-Jones, 2008): [What is] complex cannot be summarized in the word complexity, brought to a law of complexity, reduced to the idea of complexity. Complexity cannot be something which would be defined in a simple way and would replace simplicity. Complexity is a word-problem and not a word-solution. By agreeing with this perspective, which I think is also valid for “system” and “theory”, I prefer to explicitly describe the meaning of these concepts and their relations.
Theory

The definition of theory used here is borrowed from (Wolff and Resnick, 2012, Ch.1). A theory about X is a set of sentences about particular things of X, hereafter called objects. Every theory needs to follow specific rules – its logic – to draw relations between its objects; such a logic indicates a particular understanding of cause and effect. Theories need also to have entry points from where they start developing.

Reference (Wolff and Resnick, 2012) provides a didactic example using economic theories. For example, the authors describe in Chapter 2 a branch of the neoclassical theory that uses determinism as its logic, and individual preferences, production function and productive abilities as entry-points. Everything that the theory states comes as deduction based on them; some assumptions – which can be many times controversial – are also applied when needed. Utility-maximizing individuals and the concept of rationality are examples of contested assumptions that, at the same time, makes the mathematical formalization of the theory possible, strengthening their results. These results, despite their elegance, are only valid for those specific conditions; they are not universal.

By accepting this view, theories are then understood as descriptions of reality, which are always incomplete. They cannot be claimed universal by any means, but rather only producers of particular statements about their objects, always subject to revisions. I also defend that theories need to be used to realize their own value, implying that they affect, and are affected by, the world they are part. But this understanding of theory is a theory too. In this case, problems related to self-reference and circularity may emerge somehow similar to the Fitch’s paradox: if all truths are knowable, then all truths must in fact be known. To cope with those issues, it is worth defining the concept of system.

System

Among many possibilities available under the name “General Systems Theory,” I have chosen to the definition of System inspired by Luhmann (Luhmann, 2012). Starting from the assumption that systems exist, a given system is defined by a particular operation that differentiates itself from everything else (i.e. the environment); without this distinctive operation, there is no system. If one accepts this – self-referential – definition, then such an operation of that particular system cannot directly affect the environment. Hence, it can be classified as operationally closed.

This, however, does not mean that the system is independent from everything else; the case is rather the opposite – there exists a structural coupling between them. By doing this move, a given system depends on (i) its own characteristic operation to continue to be that system, and (ii) the support of the environment to sustain its particular operation and therefore its existence as such. Either internal or external perturbations have potential to change the future evolution of the system, which is always contingent; it may either become extinct or differentiate itself through a different operation.

This point opens up issues regarding time: past, present and future. It is enough to say that (Luhmann, 2012, p.144): Everything that happens now happens now. It does not happen earlier and it does not happen later. As a consequence, simultaneous events cannot be linked by causal relations (one causes the other). Under this scheme, how order and organization – concepts related to synchronization – may appear in a given system? The idea of complexity can help to answer these questions and also resolve the issues of self-referential definitions, which were so far postponed.
Complexity

The meaning of complexity is in itself complex, as illustrated by Morin’s quotation stated earlier. By accepting his view, I shall follow the suggestion given by A. Malaina (Malaina, 2015) to link the concepts of “general complexity” as in Morin thought (Morin, 2006) and of “restricted complexity” as mainly disseminated by the Santa Fé Institute thinkers (Furtado and Sakowski, 2014). The latter builds its basis on the usual scientific approaches (i.e. positivist or empiricist) without entering in questions concerning knowledge itself (i.e. epistemological questions); in this case, the investigator is an observer who is not part of the observed phenomenon, she is a first-order observer. This approach is known in the literature as “first-order cybernetics” or “theory of observed systems.” General complexity, on the other hand, deals with questions of how knowledge is constructed by the observers; it is related to the observer of the first-order observer; these studies are known under the name “second-order cybernetics” or “theory of observing systems.”

These different perspectives reinforce that complexity is *a word-problem and not a word-solution*. However, as shown by the literature on restrict complexity, this does not mean that complexity is something magical. Complexity is whatever observers see when a phenomenon evolves to states that are neither ordered nor disordered; the observer sees organization arising from interactions between acting entities (the so-called agents). By acknowledging this, complexity could be then assessed following scientific approaches while depends on the first-order observers – persons with their own constituted subjectivity – who made either qualitative or quantitative assessments. In other words, complexity is defined inside the individuals based on the constitution of their own subjectivity.

Theory as a system

Let me recapitulate what has been discussed so far: *(i)* the definition of theory is also a theory, *(ii)* any system defines itself through its particular operation and *(iii)* complexity cannot be universally defined, but depends on the observer and her constitution. From them, I can draw the following conclusions:

C1 All theories are constructed by observers;

C2 Observers are the ones classifying a given phenomenon as a system, then constructing a theory;

C3 A theory can be seen as a system whose particular operation is related to its own self-reproduction, its own use;

C4 Second-order observers can construct a theory about the construction process of any other theory.

As suggested by Luhmann in (Luhmann, 1993), deconstruction of a theory can only happen through higher-order observations. This implies that the self-reference issues discussed before shall be resolved in this way. If I accept my theory about theory, then it must be assessed following its own guidelines without recurring in unsolvable paradoxes. Therefore, second-order (or eventually higher-order) observations of the proposed theory shall provide the tools for its own meta-analysis, solving possible paradoxes from self-reference and guaranteeing its consistence. Nevertheless, the subjectivity constitution of all observers, which synchronizes their acts (as to be discussed next), keeps playing a role in the theory (de)construction processes (Althusser, 1967) and an explicit methodology may alleviate issues arisen therefrom.
**Ideology**

Theories may evolve in different ways – some may be used in solving problems external to them, while other may specialize in their own self-reproduction. The use of a theory depends on its structural coupling with the environment. Theories are constitutive parts of disciplines. But, disciplines are not only clusters of theories; they in fact have structural effects on their future. For instance, anyone who wants to contribute to a given theory within a discipline cannot isolate herself from what has been already established. If a given person was educated in a specific discipline, her decisions have little chance to be revolutionary. The established structures have conditioned her education beforehand. Everyone trained in a given discipline is constituted by its established norms, relations, theories etc. The research in a given field is nowadays further constrained by strongly coupled processes of reviewing and funding, which are usually carried out by people with similar constitution.

This deadlock is apparent, though. The future is open and, if some level of coordination among unsatisfied ones appears, structures may change, following an argument inspired by Mascaro (Mascaro, 2015). Knowledge can be, and indeed is, created even under this strong structural coupling as discussed in (Suorsa and Huotari, 2014) and references therein. The established structures can be viewed as the hidden coordinator, the “invisible hand” that makes everyone to act in similar way, consciously or unconsciously.

**Methodology**

After reading (Shchedrovitzky, 1966; Shchedrovitsky and Kotel’nikov, 1988) and other studies from the “Moscow Methodological Circle,” I understood that a shared, explicit, jointly built methodology is the frame needed for structural changes. In (Shchedrovitzky, 1966), for instance, Shchedrovitzky studied methodology as a science in itself, showing how methodologies evolved through different paths for different disciplines. In this case, methodology shall be understood as the transdisciplinary framework that facilitates the work within interdisciplinary groups by fighting the ideology that constitutes the different researchers and appears as communication problems.

3 Proposed framework

Inspired by the ideas proposed in (Shchedrovitsky and Kotel’nikov, 1988), I would argue that it is possible to resolve the overspecialization issue through “Activity Games,” based on the Soviet psychological tradition named “Activity Theory” (Leont’ev, 1978). Their view is that the methodology shall be constructed looking at the totality (Shchedrovitsky and Kotel’nikov, 1988): We now know that scientific research, partly in the process of its own immanent development and partly under the influence of the aforementioned changes in other areas of thinking activity, has broken itself down into a number of scientific subjects that have developed almost independently of one another. Consequently, to resolve any practical task effectively, special means must be adopted to reassemble these scientific subjects again, to coordinate them with development, and, finally, to fit them together into standard forms and modules of coordinated organization, leadership, and management of thinking activity carried out by groups of people.
Construction-deconstruction-reconstruction framework

Before the activity game starts, however, an initial frame related to how to proceed is needed. This preset is what I call the construction-deconstruction-reconstruction framework. The proposed transdisciplinary framework considers that theories are constructions done by first-order observers in particular contexts and historical moments. By being a construction, theories are always subject to deconstructions by second-order observers taking into account such particularities. If the deconstructed theory is planned to be reused, the deconstruction process shall be designed under the logic and the objects of the newly proposed theory. The framework used to build the transdisciplinary methodology shall map any theory from its previously established domain to a new one through the following steps.

- **Construction**: Understanding how theories as systems have evolved and constitute the individual researchers, and how the theories have been constructed from their entry-points, objects and internal logic. This part is about second-order observation and reflexivity.

- **Deconstruction**: By understanding the theories’ construction processes, deconstruction may be done by questioning the soundness of entry-points, objects and logic given their historical and contextual moments.

- **Reconstruction**: From the critical analysis done through the deconstruction process, different researchers constituted by different disciplines shall find the common, transdisciplinary, ground between their individual theories looking at the totality of the phenomenon to be assessed. The new interdisciplinary theories and methods shall be built therefrom.

Reconstruction domain

My suggestion about the domain that all theories shall be (re)constructed comes from the conjecture that reality can be always decomposed into three constitutive layers (Midgley, 1992; Kühlrenz and Nardelli, 2016): physical, informational and regulatory. It is worth saying that the reconstruction domain is then constituted of – and not individually reduced to – these layers. The relations between and across such layers and their elements need to deal with complexity and reflexivity as in (Althusser, 1967; Mascaro, 2015; Wolff and Resnick, 2012; Shchedrovitzky, 1966).

Reflexivity

The newly reconstructed theory also needs to state the particular operation related to the phenomenon under analysis and its structural coupling with the environment; all these shall be identified within the already established theories, which in turn shall disappear (at least in their own terms) in the new domain. As discussed before, the proposed framework being a theory in itself also needs to follow its own propositions for internal consistence; it shall be employed to analyze any system including itself. In this case, the proposed framework shall be also questioned within the group and a different one can be always proposed (and questioned again and again).

Limitation

This framework should be implemented within a group of people. Then, I see a clear limitation: the individual willingness to proceed in such a way. I expect that it might result psychological stress due to structural changes that it may lead.
4 Conclusions

This is an incomplete work that sets some ideas about how to construct interdisciplinary theories and methods. By looking theory as a system, a group activity game might be used to develop a shared, transdisciplinary, methodology. Such a methodology shall have the strength to combat the structural effects of disciplines on the individual researchers. In this way, effects of ideology can be alleviated and researchers emancipated to carry out a true interdisciplinary research. From this perspective, I suggest a three-step framework that the group should follow to develop their own transdisciplinary methodology that will be the common ground upon which new interdisciplinary theories and methods shall be built.

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