SYSTEMIC METAMETHODOLOGY FOR METHODS DESIGN

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ABSTRACT

There is a large collection of systemic and non-systemic methods, and even a metamethodology for the adequate selection of a systemic method for each problematic situation, but at the same time there is a void of systemic tools for the design of methods. We have two main objectives in this article; the first one is to document some of our initial advances in the design of a tool for the innovation of methods, a metamethodology for systemic design of methodologies that link systemic and non-systemic methods, and its parts. The second objective is to open a constructive dialogue on this issue with other systemic researchers that are working on this theme, we are interested in their advances, and we also want to exchange information and critical points of view with an open mind to different approaches. The design of the metamethodology is under the transdisciplinary approach to systems science.

Keywords: Method, methodology, metamethodology, cybernetics, transdisciplinarity

INTRODUCTION

Through the publication, of this article we want to promote a debate in the systemic community on the systemic design of methods. As we all know, many systemic and non systemic methods have been developed in the last fifty years, but it is difficult to find a systemic methodology for the design of methods. We are presenting a first stage of a systemic metamethodology to design new methods that link systemic and not systemic methods, and their parts.

Many systemic researchers and professionals are using different types of systemic and non systemic methods to address different types of problem situations. Most of them, just apply existing methods to problem situations as practical operators do when they don't have the necessary knowledge to challenge, and transform existing methods for specific situations. Today, there is a valuable collection of systemic and non systemic tools for systems design and improvement, that we can use for the systemic transformation of different types of systems under a particular context. For the design of new specific systemic methods, we can use the knowledge we already have from existing designs of systemic and non systemic methods. We can also examine each one of them under a critical approach to learn from their qualities and limitations, and we can also learn from our own experiences when we have applied different types of systemic tools in a variety of problem situations.

If methodologies are the tools for the creation and validation of scientific knowledge, it is important to understand the different approaches to science as knowledge. For that reason we compare different types of scientific knowledge such as disciplinary, interdisciplinary, and transdisciplinary, basic and applied knowledge, for physical, biological, and behavioral systems. Each type of scientific knowledge has implications for the design of scientific tools. The most complete approach is applied transdisciplinary knowledge, as a conceptual context for the design of systemic methods.

It is useful to make a conceptual distinction between method, methodology, and metamethodology, to understand the scope of each of these concepts. In this article, the meaning of method is a transformation process of a System through a sequence of steps toward a specific aim this objective can be theoretical or practical. Through a method we can offer an answer to the planning question ¿How?. A methodology is the study of methods, and a metamethodology is the study of methodologies.

The meaning we give to the concept design is: a creative process of integration of concrete (systems) and/or abstract (models). The transformation process of design, implies a radical change in the architecture of a system, in this case of a method to create a new method. A new system has a different number of elements and relationships, with each new architecture the system new properties emerge. The process of design is developed under a qualitative open systems approach, each new element and relationship comes from the environment, through the use of the metamethodology we can integrate systemic and non systemic methods and their parts. The aim of the systems design of methods is to provide specific process to give an adequate answer for each specific problem situation.

One important issue we need to address in the design of a new method is the congruence of the new methodological tool. For that reason an ecosystemic metaphor was also designed as a conceptual guideline for congruence in the design. A basic question we need to answer is: What was the origin and the main influences for the design of a systemic metamethodology for methods design?.

CONTEXT OF THE SYSTEMIC METAMETHODOLOGY FOR METHODS DESIGN

Kurt Flood and Michael Jackson (1991) Total Systems Intervention, TSI, was one of the main influences for the design of this systemic tool. When Michael Jackson visited México at the beginning of the nineties decade, we could appreciate the great value and richness of their systemic design of TSI: They designed a taxonomy for systemic transformation tools. Each of the main systemic tools that where developed in the last fifty years was scrutinized under a critical approach to learn of their qualities and limitations. They developed a taxonomy to classify systemic methods. Their taxonomy of systemic methods is based in the use on some of metaphors or analogies proposed by Garreth Morgan (1997). It also uses a critical systems point of view, and some of their principles such as complementarity, social and environmental consciousness, and the promotion of human emancipitation.

TSI metamethodology has the following stages:

- The first stage is for the selection of an adequate metaphor that can be used as an analogy for the problem situation.
- The second stage is used to select a particular systemic tool classified under one of the metaphors.
- In the third stage, the selected systemic tool is applied to the problem situation. The feedback is among all the different stages.

The TSI metamethodology, uses five main methafors to classify a group of systemic tools. The analogy or metaphor can represent a machine, a living being, a brain, a culture, a jail, etc. (table 1). Michael Jackson (1991) also mentioned that other metaphors such as the ecology can be applied.

Table 1. Clasification of systemic methodological tools (Flood and Jackson, 1991)

M/S-C	**METAPHORS**		
Simple and Complex	Mecanicist y neurocybernetic	Organic and cultural	Jail
SIMPLE	Hard methodologies	Soft Systems Methodologies (SSM)	Critical Heuristic Methodology
COMPLEX	Viable Systems Model (VSM)		

Note: Recently Michael Jackson (2000), instead of using three columns is using five, but the content of the fourth and fifth columns is very limited.

Flood and Jackson (1991) defined criteria with an open mind for the TSI design, they avoided the discussion on the relative merits for each type of methodology such as hard or a soft methodology approaches. Under the complementary criteria they are different and complementary. They critized the non systemic tools for their simplicity and lack of deepness, they called them modes for their unstainability.

Many professionals are using many types of non-systemic tools to address different types of problem situations. Those techniques are clear and well documented, and can provide particular answers to simple problem situations.

In the didactic process of teaching different types of systemic tools we found that is difficult to explain what types of methodologies are simple or complex. For all of this reasons we decided to create a new systemic tool for the design of new methods, that link systemic and non-systemic tools using the principle of complementarity.

Another influence for the design of a new systemic tool was the Soft Systems Methodology, MSS of Peter Checkland (1980). In the fourth step of his methodology he incorporates other tools for the design of conceptual models.

Description of the systemic metamethodology for systems design

Its design process began in 1995, with the intention to make a complementary synthesis between systemic and non systemic tools, and also with the pedagogical aim to teach the students, researchers, and professionals in a friendly way how to combine different types of methods for and adequate solution of problem situations. The name of the tool was: C5 Metamethodology (in spanish Contexto, Ciclo, Complejidad, Conciencia y Calidad) or (in english Context, Cycle, Complexity, Consciousness, and Quality). This systemic instrument has three main stages:

1- Context definition. Geocultural and temporal (Cycle of Life de), the aim of this stage is to select the system or object of study/transformation and its boundaries as a holos (system, subsistems, environment).

2- Design of the Theoretical and Methodological Framework. Through the adequate selection of systemic and non systemic methods and their integration for the specific problem situation. For this a complex process of selection and integration was designed, that we will describe in a future article.

3- Application of the designed method. The aim of the transformation process is to obtain a better organized or more complex system, to change the attitude and knowledge of the people who where involved in the process of change who are going to operate and receive the benefits of the new system, to improve their Consciousness, and to improve the integral quality of the new system. Its is permanent an iterative process of improvement under real conditions in a dynamic environment.

Table 2. Stages of the C5 Metamethodology for methods design (Peón-Escalante I, 1995)

Stage 1. What	**Stage 2. How**	**Stage 3. Iterative application of the designed method**
The group involved in different aspects of the problem situation defines the aim and boundaries of the system transformation process as an holos (system, subsystems and environment)	With the aid of a decision making tool that has three axis X- Metaphors (for the selection of systemic tools Y. Cycle of Life (for the selection of non systemic tools) Z- Cybernetic Process (for the participatory action –research architecture of the method) Through this process we select the adequate systemic and non systemic tools and integrate them to address a specific problem situation	The designed method as a heuristic cybernetic process of change is applied to improve the problem situation toward a complex, conscious, and qualitative solution.

THEORETICAL FRAMEWORK

The theoretical framework gives consistency to the method design. In the theoretical framework we apply the following concepts.

Second order Cybernetics or cybernetics on the cybernetics. (Von Foerster H, 1995). A participatory action-research architecture of the method is used. (Fals Borda O, 1998). This type of process uses a critical approach and is designed as a parallel iterative heuristic process (Stacey, 1996) of learning when we confront the method of design with the real conditions of the system in which we intervene. The first level of the cybernetic process as a closed System is oriented toward control, and the second level as an open system is oriented toward an adaptation, innovation and learning process of change. (De Greene K, 1982). In the first and second level of cybernetic transformation we have a permanent learning dynamic through the feedback loop that links models and concrete systems under the specific dynamic conditions of the real world. (Espejo R, 1996).

Life Cycle Metaphor **(**Peón-Escalante I, 1995)
Through the use of the analogy or Life Cycle Metaphor we can represent different stages in the development cycle of different types of systems. We can be aware of the violent and slow process of change of many types of systems under different conditions. The violent process of birth and collapse (Diamond J, 2005) is contrasted with the slow processes of growth and maturation.

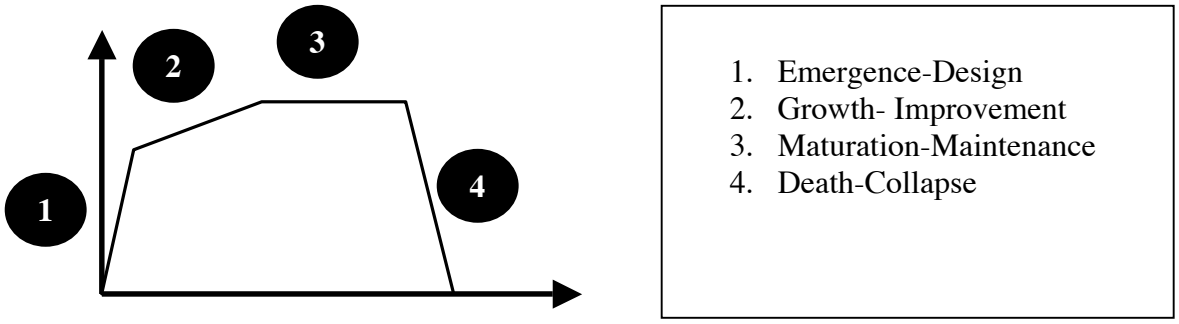

Figure 1. Life Cycle Metaphor
(Peón-Escalante I, 1995)

Ecosystemic Metaphor **(**Peón-Escalante I, 2006)
We designed this metaphor as a conceptual guideline for the design of robust methods. Its design uses as a model the evolutive dynamic of ecosystems (Lovelock J, 1990). Some of its main principles are:

Geocultural Territoriality. Each type of ecosystem exists under specific natural conditions in a territory, they are viable stable systems with a permanent identity. In the territories where they live, the human communities have developed cultures linked with the natural conditions of their habitat. For the design of specific methods for specific problem situations we have to be aware of the geocultural territory or context of the system in which we want to intervene.

Unity in diversity. A synergic type of design implies unity in diversity through complementarity. When we select and link different types of systemic and not systemic tools of change as a network process (Lipnack y Stamps, 2000) we can obtain emergent properties in the new method as a complex process of learning and change (Morin E, 1998).

Dynamic equilibrium and sustainability. The design of the method under the architecture of a participative action-research process, or an open cybernetic heuristic process is a design toward dynamic or homeostatic equilibrium. In a dynamic world, sustainability is only possible through permanent adaptive change toward equilibrium. Each method we design has feedback loops for learning and adaptive change. The architecture of the method has three main stages:

- A model as a conceptual planning context for control and learning
- Action or implementation of the plans in the real world
- A network of feedback loops linking the planning and action stages for the learning, control, adaptation and innovation processes

Transdisciplinary vision. There are broad and limited visions on the meaning of science (*Scientia* or knowledge). Many scientists and researchers believe that the concept of science applies only to the occidental approach to knowledge of the last three hundred years, a readuccionist type of knowledge. For other researchers including us, the meaning of knowledge is much broader. (Nicolescu B, 2002). The transdisciplinary vision of science or knowledge is not only interdisciplinary but also theoretical and practical as applied science; it includes also other types of knowledge such as empiric, philosophical, esthetics, etc.

APPLICATION OF THE SYSTEMIC METAMETHODOLOGY FOR METHODS DESIGN, AND DISCUSSION OF RESULTS

Its main aplication has been in the graduate programs in systems engineering and occupational health in a very large public university in Mexico, the National Polytechnic Institute, IPN. Many of the students who work with us on their thesis learn how to design a systemic methodology. Our students have different types of technical, computing, health, administrative studies and professional experience; they work in small and large public enterprises working on engineering projects, health and educational institutions, in agricultural, industrial and services projects. The metamethodology has helped them to work not only in their thesis but also in their professional projects. Our students come from different parts of the country and also from other countries from South, Central America and the Caribbean.

They apply the three main phases of the metamethodology for:

The definition of boundaries In the system they chose, they define the boundaries of

an holos (the boundaries of the systems, subsystems and environment). It is difficult process to chose with precision an open and integral system in which they can intervene. In this stage they give an answer to the important planning question: What?

The design of the Theoretical and Methodological Framework The system they chose can have different types of problem situations. Trough the application of a group of decision tools we call the cube, they can chose an complementary group of systemic and non systemic tools adequate for the problem situation. Then we integrate the different tools and its parts as a heuristic participatory action –research method and its conceptual guideline.

Aplication of the designed method. In this stage it is important to apply a participative iterative process of action-research toward the improvement of the system. Through the application of the method we change its organization toward a higher degree of order or complexity, and the human system toward a higher degree of cultural awareness, or conscience. A system that achieves a higher degree of complexity and consciousness (De Chardin P, 1966), achieves also a higher degree of integral quality toward sustainability. (Peón-Escalante I, 1996).

The main results in the elaboration of dozens of thesis and professional projects has been positive in general terms. There are many things we want to improve, such as a documentation of many systemic and non-systemic tools, the documentation of complementary techniques for the different stages of the metamethodology. We also want to have a critical and propositive feedback on the concepts and on the results in the applications.

CONCLUSIONS AND SUGGESTIONS

Through the systemic design of specific methods for an intervention process in a variety of systems, many researchers and professionals can create adequate solutions to specific problem situations. To do this they need to improve the knowledge they have on systemic and non-systemic tools. We have found out in the training process of researchers and professionals that when they have a basic knowledge on systemic and non systemic tools they can learn very quickly how to use the Systemic Metamethodology for Methods Design.

At this stage the metamethodology, is under a process of improvement, we are designing a group of specific tools for each of its stages, and we also are designing a data base on different types of systemic and non systemic instruments of change. We are in touch with a group of researchers in different fields of knowledge and professional activities to receive their feedback for in the design and application process of the systemic metamethodology for methods design in different fields of action-research.

We want to give a special recognition to COFAA-IPN for the resources they gave us for our research.

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