

# ACTIVITIES TO DEVELOP SYSTEMS THINKING

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## ABSTRACT

Six activities to develop systems thinking are described and discussion questions follow. The activities involve the creation and discussion of (1) to parts and back again, (2) points of view, (3) making a model, (4) what happens if? (5) how do they feel? and (6) playing the scene. The activities bear importantly on the ability to comprehend systems, the acquisition of system thinking, and the understanding of human cognition, cybernetics, education, inquiry, pedagogy, and social systems.

## RÉSUMÉ

Six activités à développer pour la pensée systémique sont décrites et discussion des questions suivent. Les activités impliquent création et discussion de (1) séparer et recomposer encore, (2) points de vue, (3) faire un modèle, (4) qu'est ce qui arrive si? (5) comment ils ou elles se sentent, et (6) jouer la scène. Les activités portent une importance sur la capacité de comprendre les systèmes, l'acquisition de la pensée systémique, et la compréhension de la cognition humaine, la cybernetique, l'éducation, l'investigation, la pédagogie, et les systèmes sociaux.

## INTRODUCTION

The purpose of this paper is to describe six activities in which persons can engage in and experience systems thinking. The activities described in this paper extend and almost double the list of the seven activities to be found in Minati and Collen (1997), and Collen and Minati (1999), namely: (1) sets in contrast to systems, (2) mixing colored waters, (3) harmony in music, (4) story-telling, (5) playing in contrast to designing a game, (6) a language game, and (7) a strategy that selects in contrast to combines.

Like Collen and Minati (1999), this paper presents a description of each activity followed by a short set of questions to help the participants draw out the relevance of systems thinking to the activity. Given the necessary brevity of this paper, the short comment sections can provide only a brief statement of my thinking behind each activity.

The combination of activity and conversation on the discussion questions are to encourage their pedagogical application. The questions represent a sample, and the reader is invited to generate more. In addition, the reader may discover and innovate the activities to variations which situate them more compatibly into the context of their application. After the six activities are presented, I provide some conclusions. In general, these activities may be

done across a wide age range by individuals acting alone, but they tend to be more effective in small collaborative groups.

## **ACTIVITY 1. TO PARTS AND BACK AGAIN**

### **Description**

Disassemble a working machine or appliance in an orderly fashion and lay the parts out on the floor (ground), so that they can be seen altogether as a set of parts from above. Reassemble the machine back altogether as it was, so that it works again. The activity can be done in parallel with each person working on their own machine, or in collaboration with one machine worked on by a small group.

### **Discussion questions**

1. What distinguishes a set from a system?
2. What transforms a set into a system?
3. How does taking-apart-and-putting-back-together move us toward systems thinking?

### **Comment**

To gain insight into the idea of the system stressed in this activity, in contrast to the set, the interface of the operator must be made clear. Those persons operating the machine, taking it apart and putting it back together, either in solo or as a group, provide the central formulation of the activity, that is the human activity system, rather than whether the machine as a set of parts works or it does not.

## **ACTIVITY 2. POINTS OF VIEW**

### **Description**

While at an event, whether a spectator or a player, go to at least four different locations and spend a full minute observing the event. For example, the event may be a social gathering, sports game, theatrical performance, business meeting, or work setting; and the locations may be the four major points of the compass, the corners of the room, and the center stage of the action plus three places in the periphery. Take note of what seems remarkable from each point of view, and be sure to observe the same spectators and players.

### **Discussion questions**

1. What does each point of view uniquely contribute to one's comprehension of the whole event?
2. What do the points of view have in common that might enable one to construct a stable comprehension of the event?
3. How can the complementarity of multiple viewpoints enable a comprehension of the system?

### **Comment**

Although some marked differences are likely to characterize each point of view, the challenge is to use both the common and unique facets from each point of view to grasp the whole. A discussion of this shift from the concentration on each side of the matter to an emphasis on their working together to fashion a wholistic and dynamic comprehension of the event represents a paradigmatic shift toward systems thinking.

### **ACTIVITY 3. MAKING A MODEL**

#### **Description**

Think of a place, an object, or a group of living beings. Using physical objects of any kind, construct a model of it. The one condition is that one or more human beings must be included in the model. The physical objects are to represent the structure, content, and interacting parts of the model. The model can be a location, such as a city or a lake. The model can be a scaled down construction of a known or imagined object with a human operator, such as a computer or a space craft. The model can be a group of living things, such as a family or a forest.

#### **Discussion questions**

1. What is the system: the model we think about, or what the model represents?
2. What interactions of the elements of the model reveal the system?
3. How do models help us to understand how a system works?
4. How do models help us to imagine and invent new systems?
5. In what ways does modeling serve systems thinking?

#### **Comment**

This activity helps the participants understand the great significance that modeling has for business, industry, and science as an aid to moving abstract conceptualizations to physical reality, and to where and what the system might be in the process.

### **ACTIVITY 4. WHAT HAPPENS IF?**

#### **Description**

Select an action and state what is likely to happen as a result of the action. Take the result as the action and state what is likely to be the subsequent result of it. Continue in this fashion for several steps, then pose the notion that the result could eventually lead to the original action. For example, what happens if one eats one's favorite fish, feels strong and well enough to paint the house, cleans the brush, dumps paint off the brush down the drain . . . the metals go into the lake, go into this kind of fish . . . one buys one's favorite fish, one eats it? Follow several action sequences in this fashion. Follow variations of the sequences, given different choices that can be made at each step to break one sequence and follow another.

#### **Discussion questions**

1. What can be learned about the system from its action loops and sequences?
2. What actions sustain and what actions diminish the system?
3. What does it mean to be part of the system?
4. In what ways does the interlooping of the various action sequences enable systems thinking?

#### **Comment**

The consequences of one's actions can come to graphic portrayal through this activity. Side effects and unintended consequences accompany the loss of innocence. This activity puts the focus on actions and reactions rather than elements and interactions, and comprehending the interface of related loops pose intriguing challenges to systems thinking.

## **ACTIVITY 5. HOW DO THEY FEEL?**

### **Description**

This activity is a conversation game best played with 3-4 persons. Select a situation of interest that is likely to provoke a range of reactions. Each person writes down his/her reaction to the situation. Then each person imagines the reaction of the others and writes each one down on a separate piece of paper. Each person's name is written on the outside of the paper after it is closed. The papers are sorted into piles by name, and the piles are distributed to those named. Each person takes a turn reading aloud the responses, identifying which one is his/her original reaction. Begin discussion after 3-4 situations (rounds).

### **Discussion questions**

1. Of what importance is the perception of others in a system comprised of human beings?
2. In what ways does a human system learn about itself through the views of its members?
3. What can the perceptions of a person and the group tell us about systems thinking?

### **Comment**

The perceptions of oneself and others, communicated via conversation, reveal the character, climate, vitality, health, and pathology in human social systems. This activity enables the players to become more reflectively conscious that much of what they already implicitly possess as a whole, their common knowledge about each other, enables them to think about and comprehend their social system as a whole.

## **ACTIVITY 6. PLAYING THE SCENE**

### **Description**

This activity is to conduct three rehearsals of a scene or one act of a play. It requires a group of up to 5-6 players. Each person takes one part first time through. For the second rehearsal, each person is to take a different part, and for the third rehearsal again change parts. Discussion can ensue after each rehearsal.

### **Discussion questions**

1. What happens to the ways one thinks of the system when each person can assume the identity of more than one person?
2. What does cooperation and collaboration mean in making a system?
3. What contributions can multiple parts of the same person make to sustain the system?

### **Comment**

Placing a person in different roles of a social system may change the dynamics of the system in subtle ways. This activity brings into the foreground the importance of the sides we disclose to make the social system what it becomes. It also illustrates the interdependence fostered through cooperative and collaborative action.

## **CONCLUSIONS**

These activities highlight several ways in which one can experience some of the dynamic qualities of systems thinking. As with Minati and Collen (1997), and Collen and Minati (1999), the six activities suggest to parents, pedagogues, students, supervisors, leaders, and others, who would care to recognize and illustrate through activities grounded in practical acts and

conversation groups, the concepts of cybernetics, openness, perspectivism, holism, and related conceptual areas currently associated with a general theory of systems.

The importance of the activity coupled with discussion needs to be emphasized. Where the activity brings one into the experience of systems thinking, the discussion engages one in reflection and exchange of views about those experiences, whereby a firmer consolidation and deepened understanding of systems thinking may be derived.

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4<sup>ème</sup> Congrès Européen de Systémique

4<sup>th</sup> Systems Science European Congress

**EDITEURS / EDITORS :**

Lorenzo Ferrer, Antonio Caselles, Rafael Beneyto,  
Rafael Pla, Ignacio Martínez de Lejarza,  
Vicente Rossi, Josep Martínez, J.Rodolfo Hernández,

*Valencia - Ibiza, 1999*

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**AUTOR:** Sociedad Española de Sistemas Generales  
**EDITA:** Diputación de València. Àrea d'Informatica.

ISBN: 84-7795-233-7

**DEPÓSITO LEGAL:** V - 3.804 - 1999

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