

SUCCESS TO THE SUCCESSFUL: THE USE OF SYSTEMS THINKING TOOLS IN TEACHING OB

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Abstract

This paper discusses the use of two systems thinking tools to the teaching of organizational behavior (OB) concepts and case studies. It is contended that the use of causal loop diagramming techniques and archetypes are a useful tool in assisting students to understand interdependencies, difficulties of implementation, impacts of assumptions, and to be provide further insights into OB concepts. This paper demonstrates the insights that systems thinking tools can provide by using the "Success to the successful" archetype as an example.

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SUCCESS TO THE SUCCESSFUL: THE USE OF SYSTEMS THINKING TOOLS IN TEACHING ORGANIZATIONAL BEHAVIOR

INTRODUCTION

Many business educators and practitioners have urged managers to apply “systems thinking” concepts to inform their decisions (Dent, 2001; Jambekar, 1995; Smith & Kinard, 2001; Thurston, 2000; Wreme & Sorrenti, 1997). Forrester (1993) and Kim and Senge (1994) concluded that despite the widespread recognition of the importance of understanding interdependency and change, there has been little penetration of mainstream management practice or education by systems thinking techniques. What tools can business educators provide students with to enhance their systemic thinking skills? It is contended that causal loop diagramming (CLD’s) and archetypes are a useful set of conceptual tools that can assist students to understand interdependencies, difficulties of implementation, impacts of assumptions, and to be provide further insights into OB concepts where linear management theories might not.

In 1969, Weick explored the general notion of interdependence as a way of viewing the world. He introduced the concept of causal mapping for thinking through a variety of interdependent situations that confront managers. Cavaleri and Obloj (1993) argue that many traditional management theories are concerned with cause and effect relationships that emphasize a one way, linear line of influence. Systems thinking is concerned with feedback systems which lead to nonlinear relationships. It is in this sense that the systems thinking perspective provides a unique framework for interpreting behavior in organizations.

Thurston (2000) states that “...learning to think systemically is no simple feat” (p.11) and concludes that enabling students to think systemically in part begins with discussion of systems thinking concepts and the relevance of systems thinking in integrating multiple perspectives of organizational topics. This discussion will attempt to demonstrate how learning the technique of constructing a causal loop diagram can be used as a first-step teaching tool to help establish the concepts of causation, positive and negative feedback and closed loop feedback systems. Once an understanding of developing a causal loop diagram has been established with students, it is then possible to move on to having students apply the Senge (1990) concept of archetypes to analyzing organizational behavior situations. Senge (1990) identified patterns of causal loops that appear consistently through various types of systems that generate the same types of behavior; these generic forms are referred to as archetypes. The archetype referred to as *Success to the Successful* is used as an example of how archetypes can be used to explore OB case studies.

Ginsburg and Morecroft (1997) report success integrating feedback systems thinking into the case method for corporate strategy cases. Frost and Fukami (1997) draw a comparison between the content teachers deliver on effective management and the classroom management process. They identify the application of concepts such as systems theory as a “classroom-as-organization” teaching mode where the students’ learning of the principles of systems theory is related not in management content terms but in learning process terms. The application of systems thinking to organizational behavior (OB) case studies, encourages students to focus on learning about relationships that produce patterns of observed outcomes rather than focus purely on outcomes.

USING SYSTEMS THINKING TOOLS IN THE CLASSROOM

Bolman and Deal (1994) concluded that managers and organizational theorists often assume a linear, cause-effect relationship between activities and outcomes. Similarly, Bacharach (1988) concluded that the relationships between antecedents and consequences are often assumed to be linear. Bacharach argued that this assumption could be naïve, in the context of qualitative understanding of people in organizations. However, systems thinking as a conceptual framework deals not only, with the cause and effect, which managers identify in real life, but also considers the phenomenon of closed loop feedback systems. Systems thinking has the advantage of focusing on *closed interdependencies* and therefore on feedback rather than linear relationships.

Goodman (1991) stated that systems thinking could be thought of as a language for communicating about complexities and interdependencies and as a communication framework. The visual language of causal loop diagrams and systems archetypes can help clarify and summarize complex issues and clearly identify the key elements involved. The specific set of rules that govern systems diagrams can reduce or highlight ambiguities that occur when analyzing complex issues. The use of systems diagrams forces an explicitness of what Senge (1990) refers to as mental models. According to Senge, mental models are "...deeply ingrained assumptions, generalizations, or even pictures or images that influence how we understand the world and how we take action" (p. 8). Senge's mental models are similar to the concept of cognitive schemata or maps and are derived from Argyris' (1982) espoused theories and theories-in-use. The construction of causal loop diagrams helps the student express how she or he believes the system works.

Systems Concepts Relevant to OB

The core generic concepts from systems thinking that are applied to this OB teaching example are causation, feedback, behavior over time, and balancing and reinforcing loops.

Establishing causation is useful for the understanding of many organizational behavior processes e.g., the causal relationship between rewards and behavior and in tracing unexpected and counter intuitive outcomes of reward systems.

The concept of feedback in organizational theories and case studies can provide the means to focus student attention on the long term effects of actions and decisions over time, decision lags and the different impact of positive and negative feedback. Mowday and Sutton (1993) in a comprehensive review of the research undertaken in Organizational Behavior found that reciprocal relationships or feedback relationships are often not evident in traditional Organizational Behavior research. This can preclude feedback from being included in behavioral and organizational models. However, if systems thinking tools are used, feedback can be included in the discussion of these models. It is often at this point during class discussions, the certainties of linear cause and effect tend to disappear and students can reframe and reconceptualize their ideas about the outcome of traditional OB models. The notion of feedback is also important in the establishment of the concept of variations in behavior over time, which in turn can be applied to organizational models or case studies to expand the insights provided by these frameworks.

The concept of behavior over time encourages students to think beyond the first set of causal connections and to consider the feedback implications of the behavior of the system over time. An example of feedback behavior over time can be demonstrated using group norms. When group norms produce behavior that leads to group success, there is a tendency towards conformity to that behavior. Increasing conformity can lead to groupthink, which in turn can lead to a reinforcement of the group norms.

Finally the pervasive presence of balancing and reinforcing loops present in organizational systems needs to be understood. They are the systemic processes that serve to dampen or accelerate organizational processes.

Reinforcing loops continue and often accelerate processes of change within the system. Reinforcing loops are positive feedback loops, in that they reinforce some behavior, either for better or for worse, in a system. For example, many reward systems are designed to continue and increase desirable behaviors. By comparison balancing or negative feedback systems seek to establish organizational stability. In doing this, balancing loops take variation out of the system and seek to bring the system back into equilibrium. However, while rewards encourage and reinforce behavior, the rewarded behavior does not go on increasing forever. A balancing or negative feedback loop operates so that the need for the reward diminishes and the behavior asymptotes, namely people strike some balance between how hard they are prepared to work to gain rewards and achieving some balance in the rest of their lives.

Systems thinking concepts can be articulated in causal loop diagrams using causation, feedback, behavior over time, and balancing and reinforcing loops to enable students to view organizations and their subsystems as more than simply linear systems that behave in predictable ways. Systems thinking incorporates feedback from positive or negative reinforcing systems which opens up the possibility of non-linearity and an increasingly diverse range of behaviors.

The Technique of Using Causal Loop Diagrams in Class

As preparation for the class, students are asked to read Chapter 5, *A Shift in Mind* and *Appendix 2: Systems archetypes* in Senge's book *The Fifth Discipline* (Senge, 1990). The chapter explains causal loop diagrams and also covers the fundamental aspects of systems thinking, in particular reinforcing and balancing feedback. The appendix covers in detail each of the eight archetypes. Alternative additional references include *Systems Archetypes 1* by Kim (1992) or *Systems Thinking Basics* by Anderson and Johnson (1997). Causal loop diagrams provide a useful way to illustrate how variables in a system are interrelated. The closed loop form of the causal loop diagram (CLD) demonstrates cause and effect linkages (Lannon-Kim, 1991). According to Kim (1990) causal loop diagrams

...make explicit one's understanding of a system's structure, provide a visual representation to help communicate that understanding, and capture complex systems in a succinct form. (p.3).

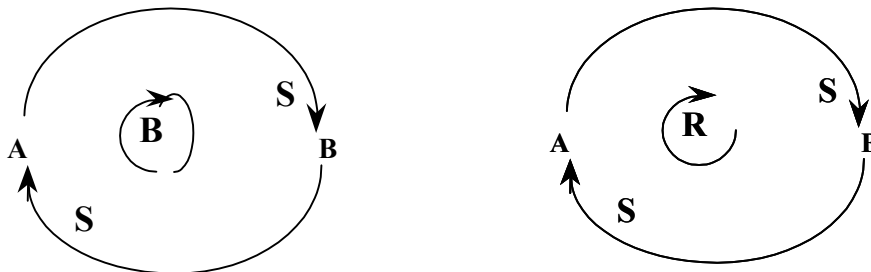
There are certain terms or "language" used in causal loop diagrams (Senge, Roberts, Ross, Smith, & Kleiner, 1994) that students need to be familiar with. Figure 1 shows the two types of direct causation. In the left hand diagram, the arrow indicates that A causes B, and the "S" sign indicates that changes in A lead to changes in the same direction in B. So if A increases B increases, or, if A decreases, B decreases. In other words the change is in the same direction. In the right hand diagram, X causes Z, but here the "O" sign indicates that changes in X lead to changes in the opposite direction in Z. So if X increases, Z decreases, or, if X decreases, Z increases. In this case the change is in the opposite direction.

Figure 1: Links and Variables



In Figure 2, there are two loops, a balancing loop on the left and a reinforcing loop on the right. An explanation of the reinforcing loop says, *As A increases, B increases, as B decreases A decreases, achieving a reinforcing loop in an upwards spiral balance.* A walk through of the balancing loop says *As X increases Z decreases, as Z decreases X increases, achieving a balance.*

Figure 2: Reinforcing and Balancing Feedback Loops



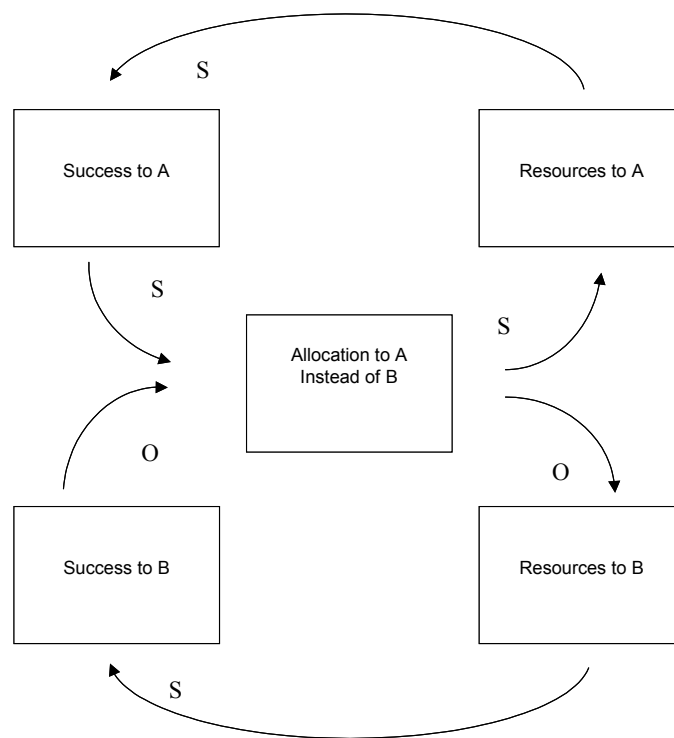
A demonstration of the visual learning aspect of system thinking can be shown by using the example of the reinforcing and balancing systems associated as a result of the balancing feedback loop using the *Success to the Successful Archetype*.

Using Systems Archetypes in the Classroom

In the *Fifth Discipline*, Senge (1990) identified eight archetypes that he believed constitute consistent patterns of behavior in organizations. Kim (1990) defined systems archetypes as a set of common dynamics that recur in many different situations. The use of the archetypes can assist students in identifying common systems behaviors that may fit into one of these recurring patterns (Kim, 1990). A deeper insight into the systems concepts of causation, behavior over time, and positive and negative feedback loops can occur when students are able to identify these generic structures in their organizational and personal lives. Senge (1990) concluded systems archetypes “..suggest that not all management problems are unique, something that experienced managers know intuitively.”(p. 94).

Any one of the archetypes can be used to explore core organizational behavior topics from a systems framework. For the purpose of illustrating how archetypes can be used in OB teaching situations the *Success to the Successful* archetype has been chosen to highlight the way that structure, often emergent structure, can dictate the way that people can perform. Once scarce resources are allocated, the person or group of people who receive them get "on a roll" and become successful. Those who are denied resources are less able to perform. The structure forces individuals or groups to compete for a limited resource (e.g. manager's time). Assuming both individuals (or groups) have the same capabilities, if one is given more resources (A), they are more likely to succeed than the other (B). A's initial success means they are more likely to receive further resources than B and thus the structure is perpetuated.

Figure 3: Success to the Successful Archetype



An example of this is where two basketball players of equal ability are competing for a place in a team. One gets injured, so the other is selected. In this case the resource is team selection. If the team is successful, the coach is unwilling to break up a winning combination. Thus the player who has returned from injury does not get access to the resource of "team selection" and is denied a chance to get back into the team. This loop is an excellent example of how structure can dictate the way that people can perform.

Angela and Trevor and the Case of Success to the Successful

The case vignette of Angela and Trevor provides a vehicle to discuss what happens once scarce resources are allocated to a particular person the structure will continue to reinforce the success of one, and the downfall of the other. Those who are denied resources are less able to perform. This case can be linked to a discussion of motivation theory. What are the implications for motivating staff when the dynamics of *Success to the Successful* set in? What motivation theories explain what is happening?

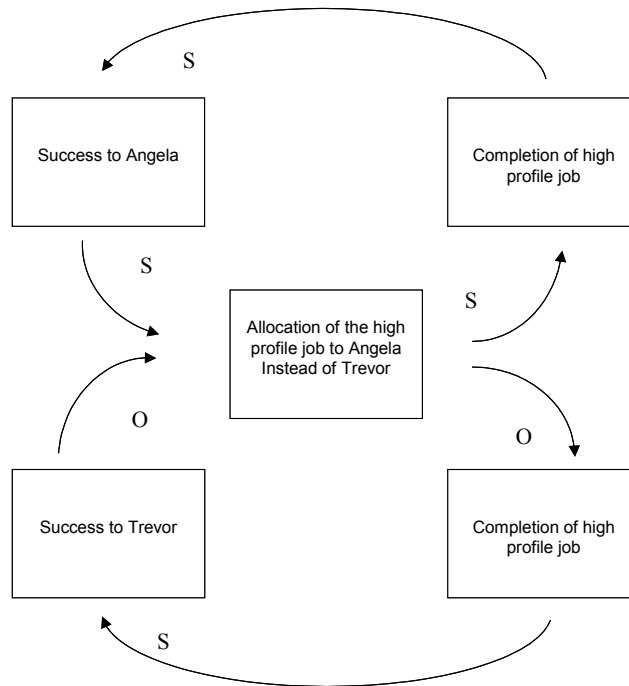
You have just hired two young trainee technical officers for a probationary period of one year. There are a number of tasks that they will both be capable of handling and at the end of the year the company can make a decision on who will stay.

The first, Angela, has been given the task of testing a component for a prototype of a new product with the Design Engineer. The second, Trevor, has been asked to survey a number of customers on the performance of a product that has been a real disaster and created much customer unhappiness. He is working with the Marketing Officer.

Angela was able to finish her task in two weeks with very good results that were well received in the company. Trevor, on the other hand, was still on the phone chasing appointments in the same period. Angela's next task was a small project for the Senior Design Engineer.

The first question to ask students, "Is who would you prefer to be at this point of time – Angela or Trevor?" Overwhelmingly most students respond that they would prefer to be Angela. The next stage of the class is to explore why i.e., what is it about the dynamics of the situation that lead to the likelihood of one employee continuing to be successful, and the other likely to be in a loop where they are not successful, no matter how they perform. Students also realize that the important part of the equation is the allocation of the "relatively high profile" job over the "less high profile job". Students can be divided into groups to discuss and draw their version of the Angela and Trevor *Success to the Successful* archetype (See Figure 4 for the variables that might be identified by students). After this discussion, links can be made to what impact is this likely to have on Trevor's motivation? It is important that teachers emphasize to students that the archetypes are recurrent, but not all pervasive, patterns of organizational life. Nonetheless, this should not detract from the message that once the archetypal patterns are established in an organization, they become powerful determinants of behavior.

Figure 4: Angela and Trevor and the Case of Success to the Successful



Issues with Using Systems Thinking Concepts as a Tool for Teaching

This paper uses the archetype of *Success to the Successful* to examine instructional issues concerning using systems thinking tools. Each of the systems archetypes identified by Senge (1990) embodies a particular theory about dynamic behavior that through group deliberations can further guide students to understand sets of interrelationships. Kim (1995) proposes that each systems archetype offers prescriptions for effective intervention.

This example of using the *Success to the Successful* archetype is only one illustration of how OB concepts can be explored using systems thinking tools. Other examples we have used in the classroom center on leadership theories and reward systems and the application of student generated causal loop diagrams. For example, having students select one theory of leadership and develop a causal loop diagram that identifies the key interconnections and dependencies described by the theory. It is then possible for students to evaluate the theory against their own experiences using the causal loop diagram as a guide for their discussion. In another particularly effective exercise for making the distinction between short and long term consequences, students identify the formal and informal rewards for key behaviors in their organization. Students then prepare a causal loop diagram that demonstrates how the reward system works and discuss whether the rewarded behaviors are consistent with organizational goals. The causal loop diagram can then be used as a basis to identify key leverage points in the system that could be used to more closely align the reward system with organizational goals.

Systems thinking tools such as causal loop diagrams and archetypes are clearly a visual language that might not work for all students. Some students never really come to terms with a causal loop diagram. Students sometimes get frustrated and feel they are force fitting archetypes to case situations. Our experience is that, for most students, it takes time and practice to become totally familiar with these concepts. It certainly works best if it is part of an overall approach to a teaching program and the concepts are applied to a wide range of subjects including Organizational Behavior.

The use of systems thinking tools as an instructional method often creates considerable and intense debate because students are drawing their view of the world and exposing their mental models. This friction is not surprising as students are drawing in diagrammatic form their view of the world (or at least part of it).

Sometimes there is lively discussion when a model does not work and the key dependencies and directions of causality are disputed or difficult to identify. Nonetheless, presentation of causal loop diagrams in class is a powerful vehicle for discussion about how different parts of a system relate.

These tools do not replace traditional organizational behavior instructional approaches but do help explore issues from an alternative paradigm. The author would not advocate explaining every management concept or case study using causal loop diagrams or the indiscriminate application of the Senge (1990) archetypes. Systems thinking tools are useful in explaining situations where key causalities can be identified. In this context, it lends itself to case studies and discussions of situations where recurring patterns are likely to be present. A final note. It is important not to expect too much too soon. A familiarity with the language of systems thinking and archetypes are the keys to developing a sense of understanding causality and negative and positive feedback. However, if this is to happen it is necessary that the students have a strong grasp on the technique of causal loop diagramming. Without this, classroom experiences can be negative and counterproductive.

CONCLUSION

It is argued that the application of these fundamental systems thinking concepts such as causal loop diagrams and archetypes can increase students' understanding of organizational behavior cases and concepts. The contribution that systems thinking tools and processes make to the broader domain of education and learning is to provide a teaching process where an understanding of interdependence, interactions and dynamic processes of situations is encouraged. Cavaleri et. al. (1993) concluded that the insight that various types of causal feedback loops and archetypes are linked to different systemic behaviors can help managers and students understand why a system behaves in a particular way and enable them to consider ways to change the system. This discussion examines the way in which the application of systems thinking to organizational behavior case studies encourages students to look at the situation using a framework that encourages understanding and analysis of parts of a system and conditions that create or affect the interdependencies. Systems thinking provides a framework that can be applied across a wide range of examples of organizational behavior in a consistent and comprehensive way and provides a methodology for producing an integrative view of the discipline. Finally, the teaching methodology proposed is integrative. However, as Thurston (2000) concludes, enabling students to think systemically requires more than students understanding a few systems thinking tools. Instead, it needs to be part of a learning space where students are introduced to thinking systemically as part of a broader approach to understanding organizational topics.

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