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Success to the Successful: The Use of Systems Thinking Tools in Teaching OB

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This paper discusses the use of an experiential pedagogy based on two systems thinking tools that can be incorporated in the teaching of organizational behavior (OB) concepts and case studies. It is contended that combining causal loop diagramming techniques and the application of Senge's archetypes provides useful tools in assisting students to understand interdependencies, difficulties of implementation, impacts of assumptions, and provide further insights into OB concepts. This paper demonstrates the insights that these systems thinking tools can provide by using the "Success to the successful" archetype as an example.

Many business educators and practitioners have urged managers to apply "systems thinking" concepts to inform their decisions (Jambekar 1995; Wreme and Sorrenti 1997; Thurston 2000; Dent 2001; Smith and Kinard 2001). Forrester (1993) and Kim and Senge (1994) concluded that despite the widespread recognition of the importance of understanding interdependency and change, there had been little penetration of mainstream management practice or education by systems thinking techniques. 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) argued that many traditional management theories are concerned with cause and effect relationships that emphasize a one way, linear line of influence. One of the central concerns of Systems Thinking and System Dynamics in particular, is the feedback systems which lead to nonlinear relationships. The discussion in this paper assumes System Dynamics as a core discipline of Systems Thinking. It is in this sense that the Systems Thinking perspective provides a unique framework for interpreting behavior in organizations.

What tools can business educators provide students with to enhance their systemic thinking skills? It is contended that causal loop diagrams (CLD's) and archetypes provide a useful set of conceptual tools that can assist students in two ways. The first is to deepen the understanding of interdependencies, difficulties of implementation, impacts of assumptions, and provide further insights into OB concepts. Thurston (2000) stated that "...learning to think systemically is no simple feat" (p.11) and concluded that enabling students to think systemically in part begins with a 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 teaching students to construct a causal loop diagram can be 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 “Success to the Successful” is used to explore OB case studies.

The second is to help students understand their own modes of thinking, termed mental models, in relation to these processes. 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 to 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 explore 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 students express how they believe the system works.

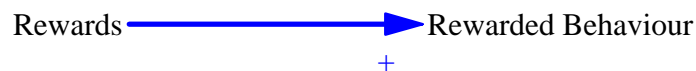
Systems Concepts Relevant to Understanding Archetypes

Four core generic concepts from systems thinking need to be explained to the students in order to introduce issues of interdependencies which are fundamental to the understanding of archetypes. The concepts are causation, feedback, behavior over time, and balancing and reinforcing loops. A brief explanation of each concept is provided below. Once these concepts have been

explained, it is useful to ‘walk’ students through an explanation of how causal loop diagrams work.

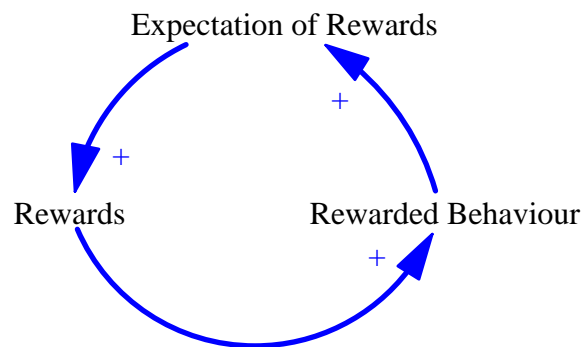
Establishing causation is useful for the understanding of many organizational behavior processes e.g., the causal relationship between rewards and behavior and in tracing unexpected and counter intuitive outcomes of reward systems. The following can be used as a classroom example of the linear causal relationship between rewards and behavior. Figure 1 shows that rewards increase (+) rewarded behavior.

FIGURE 1
Rewards and Behavior



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 and importantly some unintended consequences. Figure 2 establishes a potential circular, or feedback effect of reward systems. The use of rewards, perhaps bonuses, increases the need to keep using bonuses to get desired behavior. This constitutes a positive feedback or reinforcing loop.

FIGURE 2
Rewards, Behavior and Expectations

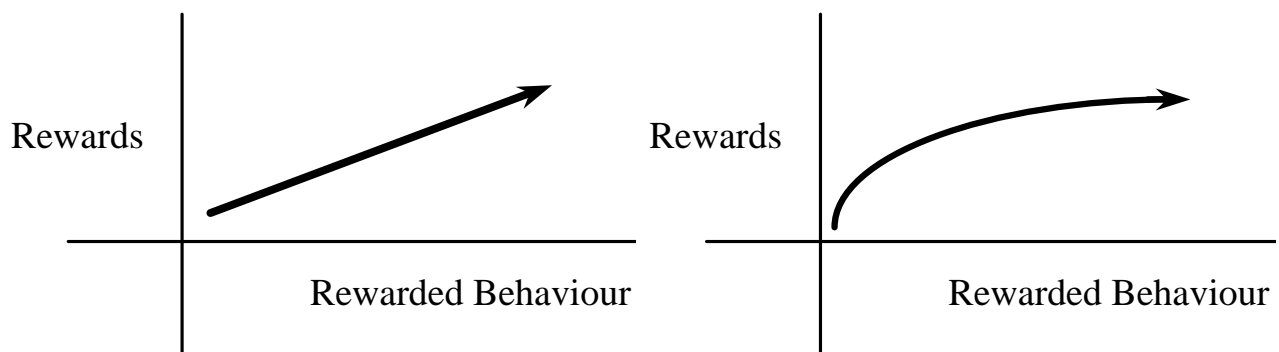


Mowday and Sutton (1993), in a comprehensive review of the research undertaken in Organizational Behavior, found that reciprocal or feedback relationships are often not evident in traditional Organizational Behavior research. This can preclude feedback from being included in behavioral and organizational 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, that the certainties of linear cause and effect tend to disappear and students can reframe and reconceptualize their ideas about the outcome of other traditional OB models, such as the relationship between group homogeneity and group think or the relationship between leadership and followership. 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.

Class discussion of the rewards to rewarded behavior leads to development of a behavior over time graph shown in Figure 3. After discussion, students suggest the behavior shown in the left hand graph indicates that behavioral outcomes, such as improved performance can continue increasing. Students quickly suggest the possibility of the diminishing effect of reward systems as shown in the graph on the right.

FIGURE 3
Behavior Over Time Graph

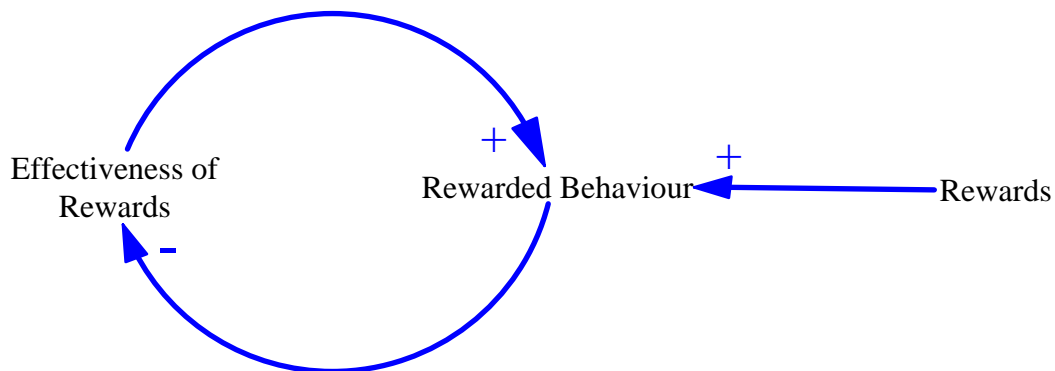


The concept of behavior over time encourages students to think beyond the first set of causal connections and to consider the feedback implications of the behavior of the system over time. Another example of feedback behavior over time can be demonstrated using group norms. When group norms produce behavior 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 with a flattening or decline in creativity and critical thinking

Finally, the pervasive presence of balancing and reinforcing loops in organizational systems needs to be understood. These 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. The CLD shown in Figure 2 demonstrates this. 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. Although rewards encourage and reinforce behavior, the rewarded behavior does not go on increasing forever. The use of rewards over a period of time causes the effectiveness of the reward to decrease (-) shown in Figure 4. The declining effectiveness of the rewards leads to a decline in the rewarded behavior. It is important to note that the effectiveness still contributes to the rewarded behavior but at a lesser rate.

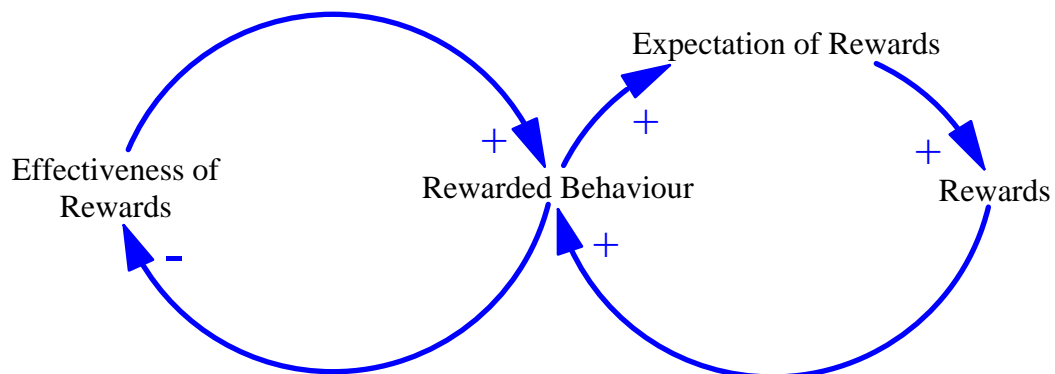
FIGURE 4

Rewards and a Balancing or Negative Feedback Loop



This balancing or negative feedback loop operates so that, as the effectiveness of the reward diminishes, the behavior asymptotes. The effectiveness of reward systems can decline as 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. Now students are able to link the two diagrams together as shown in Figure 5 where the left hand loop serves to maintain a balance against the driving effect of the right hand loop.

FIGURE 5
Reinforcing and Balancing Feedback Loops and Rewards



As demonstrated in Figure 1 through to Figure 5, 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 the effect of positive and negative feedback systems which, in turn, 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 Systems Thinking Basics by Anderson and Johnson (1997). The book explains causal loop diagrams and also covers the fundamental aspects of systems thinking, in particular reinforcing and balancing feedback. Alternative additional references include Systems Archetypes 1 by Kim (1992) or Chapter 5, A Shift in Mind and Appendix 2: Systems archetypes in Senge's book The Fifth Discipline (Senge, 1990). All of these readings emphasize how causal loop diagrams provide a useful way to illustrate the interrelationships of system variables. 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. (1990:.3).

A more detailed demonstration of the visual learning aspect of system thinking can be shown by using the example of the reinforcing and balancing systems associated with 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).

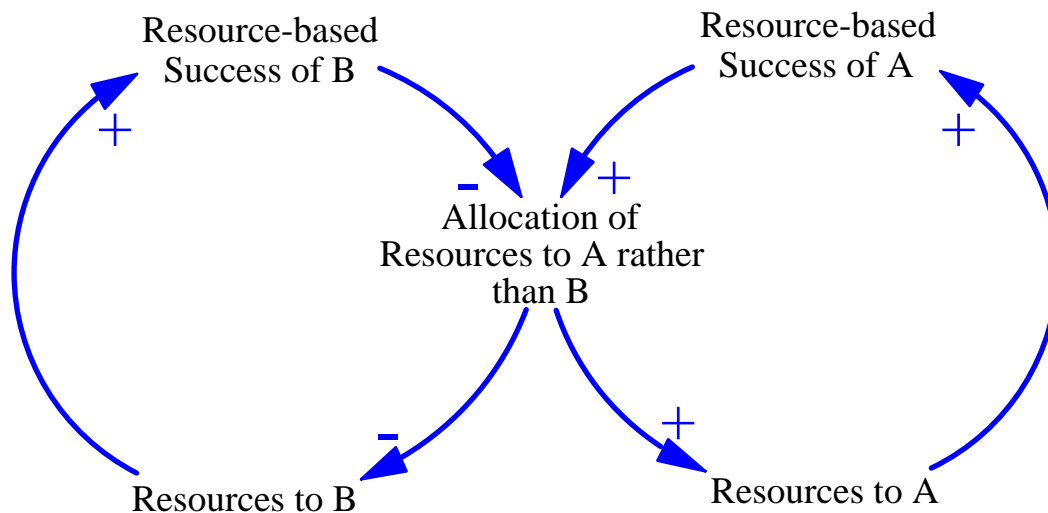
According to Bellinger (2003) there are four effective ways to use archetypes. These are as "lenses," as structural pattern templates, as dynamic scripts (or theories), and finally as tools for predicting behavior. Each approach provides a different method for generating discussion or gaining insight into a problem. Any one method, or a combination of them, may best fit students' particular situation or preferred learning style. We suggest that a combination of using the archetype as a "lens" and providing a short case vignette that can be used as a structural template to demonstrate the archetype is an effective way of incorporating systems thinking ideas in an OB class discussion. Any one of the archetypes can be used to explore core organizational behavior topics from a systems framework. We have had success using "Drifting Goals" to demonstrate the subtle erosion of ethical standards in a company. For the purpose of illustrating how archetypes can be used in OB teaching situations the "Success to the Successful" archetype (Senge 1990) has been chosen to highlight the way that structure, often emergent structure, can dictate the way that people can perform.

Angela and Trevor and the Case of Success to the Successful

In order to demonstrate the specific set of language rules that govern causal loop diagrams and archetypes, students are given a brief introduction to the concept of causal loop diagrams and particularly the concepts of feedback, reinforcing and negative loops as discussed previously. Participants are then given a handout of the “Success to the Successful” template (See Figure 6) and provided with an explanation of how the archetype works and an example as follows.

The theory of the “Success to the Successful” archetype is demonstrated in Figure 6. Here, one person (“A”) is given more resources, (e.g. attention, time, or practice) than another person (“B”). In this scenario, not only will A will have a higher likelihood of succeeding than B, A’s success will be the cause of B failure. The reason is that the initial success of A justifies the continued allocation of the resources and this has the effect of continuing the success of A. However, this can be at the expense of B. As A gets resources, B gets fewer resources and B’s chances of success diminish, which further justifies “backing a winner” and allocating more resources to A. The predicted outcome of this structure is that A will succeed and B will not. There are two important teaching points here. The first is that A’s success is not related to A’s ability, it is a result of the systemic impact of the unequal allocation of resources. The second is that organizations can fall into the trap of long term and systemic discrimination unless resources are carefully allocated.

FIGURE 6
Success to the Successful Archetype



Another 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, selection is a process rather than a “resource”. However, the effect is the same. 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 selected and is denied a chance to get back into the team. The resource that the

selected player has access to is "playing on a successful team". It is useful to point out to students that this archetype also operates in the opposite fashion. If the team fails during the absence of the injured player, the continued selection of the second player is less likely and the inclusion of the returning player more likely. This archetype could be called "Failure to the Loser". This loop is an excellent example of how structure can dictate the way that people can perform.

We use the "Angela and Trevor" case study as a vehicle to illustrate the "Success to the Successful" archetype and systems thinking concepts. Students are divided into groups of three or four participants to read and discuss the case study and fill in the appropriate blanks in the "Success to the Successful" archetype. Plenty of instructor guidance is provided to the groups at this stage because it is not expected that everyone will have the same familiarity with these concepts. The students will then be asked to report their findings back to the group. Once the exercise has been completed, the students are debriefed and the overall discussion will focus on how systems thinking tools (such as archetypes) can surface assumptions that are often taken for granted.

The case vignette of Angela and Trevor provides a means to discuss what happens once scarce resources are allocated to a particular person and the structure continues to reinforce the recognition and success of one, and the lack of recognition and opportunity of the other. Those who are denied resources are less able to perform. It is also important to emphasize that high profile tasks are a resource that people can exploit to their advantage and the allocation of these "resources" is central to this case study.

Success to the Successful: The Case of Angela and Trevor

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 a Marketing Officer.

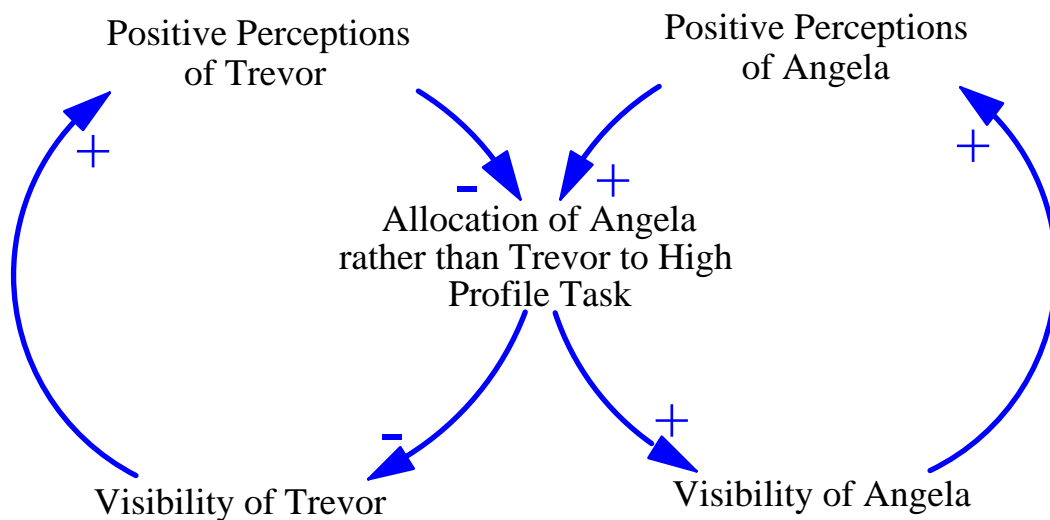
Angela was able to finish her task in two weeks with very good results that were well received in the company. Trevor, on the other hand, was still on the phone chasing appointments in the same period. Angela's next task was a small project for the Senior Design Engineer.

The first question to ask students is, "Who would you prefer to be at this point of time – Angela or Trevor?" Overwhelmingly, students respond that they would prefer to be Angela. The next stage of the class is to have students explore why. Using the "Success to the Successful"

archetype as a template students can discuss and attempt to identify 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 perceived as less successful, no matter how they perform. Students can be divided into groups to discuss and draw their version of the Angela and Trevor “Success to the Successful” archetype using the template for this archetype. Figure 7 shows an example of the variables that might be identified by students.

The next step is to facilitate student discussion about what the Angela and Trevor case demonstrates about structural forces versus innate ability and talent. During the course of that discussion, most students identify that the outcome for Angela and Trevor is highly dependent on a set of initial conditions that favor Angela over Trevor. If Trevor had been given the job with the higher status Design Engineer involving a task that could be completed successfully in two weeks, rather than a job with the lower status Marketing Officer that by its nature could not be completed in a short period, then the roles for Trevor and Angela would have most likely been reversed. Thus, the “Success to the Successful” archetype suggests that success may depend as much on initial chance and the emergent structure (namely perceptions of Angela's ability). The paradox is that Angela's success is a result of system structure rather than ability.

FIGURE 7
Angela and Trevor and the Case of Success to the Successful



Daniel Kim (1992) raised the point that an implicit assumption of the “Success to the Successful” archetype is that whoever wins must be the best, when the reality may be it is the structure that determines the ‘winner’. This is an important message for understanding behavior in organizations. Students can be encouraged to think about ways to break out of the structure. For example, replace competition with cooperation where the focus is on creating an environment for success rather than trying to identify successful individuals. The teaching objectives are therefore to encourage students to ask questions such as:

- Are there structures in place that dictate certain outcomes?
- What kinds of trends or patterns of events seem to be recurring?
- What can be done to break out of the structure of the archetype and explore possibilities that are not characterized as being win-lose?
- What are the implications for motivating staff when the dynamics of “Success to the Successful” set in?
- What motivation theories explain what is happening?

The archetype exercise also introduces students to a useful set of conceptual tools, in particular the archetypes, which can assist them to understand interdependencies, difficulties of implementation, impacts of assumptions, and provide further insights into OB concepts where linear management theories might not.

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 important message that once the archetypal patterns are established in an organization, they become powerful determinants of behavior.

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 discussion, can further guide students to understand sets of interrelationships. Kim (1995) proposed 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 will suit some students preferred learning styles. 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. 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 are best used in conjunction with a wide range of teaching techniques. A fundamental tenet of Systems Thinking is the provision of multiple perspectives on any given problem. As we have said, some students get more insights using these techniques than others. Some are more comfortable with traditional organizational behavior instructional approaches and CLD's and archetypes will simply help explore issues from an alternative paradigm. The authors 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 and where it is important to identify long-term behavioral implications of management decision. In this context, Systems thinking 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 is the key 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 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 makes 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 Systems Thinking can help managers and students understand why a system behaves in a particular way and enable them to consider ways to change the system. 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) concluded, 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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