

**Using Systems Thinking to Improve Organizational Learning in the
Public Sector : Perspective of Public Officials**

Tsuey-Ping Lee
Associate Professor
Department of Public Management and Policy
Tunghai University
Taiwan, R.O.C.

Abstract

This study examines how public officials who have completed a one semester two-credit systems thinking graduate course consider how systems thinking training affect their way of thinking and daily administration behavior. Additionally, this study also focuses on how these public officials perceive the barriers to adopting systems thinking for the improvement of organizational learning in the public sector. This study employs a self-evaluated survey as the research method. The research results demonstrate that, after finishing the systems thinking course, questionnaire respondents request more from leaders to clarify organizational goals and to provide incentives for members to bring up innovative ideas. Meanwhile, respondents believed that they considered communication and teamwork important more than before taking the course. However, respondents appeared not to highly value their own role in achieving organizational goals, and to doubt their own willingness to incorporate new ideas into daily routines. Additionally, public officials believe that organizational leaders lack concepts and practice of systems thinking, and public organizational inertia, thus leading to the failure of systems thinking practice to improve organizational learning. This study provides suggestions for systems thinking course design based on the survey results.

Using Systems Thinking to Improve Organizational Learning in the Public Sector : Perspective of Public Officials

Organization refers to a social system that gathers individuals for specific purposes. To achieve effective organizational functioning, as well as helping an organization to survive in an increasingly dynamic and complex environment, and thus improve the world, it is important to design organizations that are capable of learning. Organizations with learning capability should motivate and train their members to continually expand their capacity for creating desired organizational effects. Organizational learning focuses not only on organizational learning as a whole, but also on individual learning. Although individual learning does not ensure organizational learning, it is a prerequisite to organizational learning (Senge, 1990: 139).

Systems thinking has long been considered a cornerstone of organizational learning (Senge, 1990). People who adopt systems thinking in identifying personal values in the organizations, finding leverage solutions for organizational problems, developing strategic plans for organizational sustainability and so on, are improving their organizational learning skills. Although a group of individuals adopting systems thinking do not guarantee organizational learning, systems thinking has been identified as an effective means of helping organizations follow a correct learning path. Organizational learning requires member understanding of current reality. Systems thinking is a valid tool and perspective for understanding current reality. Additionally, by examining reality using a systems thinking perspective, which focuses on the relationships among different parts of the system, organization members improve their understanding of how their ways of viewing things and their methods of dealing with each other can create butterfly effects on the organization. A group of systems thinkers thus will be willing to establish mutual trust, dedicate themselves to team learning, understand organizational visions, and explore and change personal mental models. All of these actions can clearly enhance organizational learning.

A key question is how systems thinking and organizational learning will work in the public sector? Recently, governments have faced enormous pressure to reform (Ackroyd, 1995) due to both political and economic reasons. Traditional management practices in the public sector appear incapable of dealing with the complexity associated with dynamic environments. To respond to the public desire for greater government innovation and creativity, public organizations are required to increase their commitment to organizational learning. Leaders of public organizations believe that organizational learning is a vehicle for achieving reform (Betts and Holden,

2003). Organizational learning practice within the public sector has received relatively little research attention to date. Studies on systems thinking practices in the public sectors are rare. Although systems thinking is believed to be useful in improving organizational learning, this study intends to examine the difficulties of adopting systems thinking in the public sector.

This study describes how public officials who have taken a two-credit systems thinking course perceive the influence of systems thinking training on their thinking and behavior. Additionally, this study focuses on how these public officials conceive the barriers to adopting systems thinking in the public sector. This study does not aim to measure the extent to which systems thinking improves organizational learning. However, we recommend that public officials self-evaluate if taking a systems thinking course can help them improve organizational learning.

A literature review demonstrates that an appropriate measure of examining potential of members to improve organizational learning is under development. This study thus employed five aspects of organizational learning developed by Goh (2003) and Templeton et al. (2002) and adjusted them to produce a more appropriate analytical dimension for this study. These five aspects of organizational learning are clarity of organizational goals, leadership, experimentation, communication, and teamwork and group problem solving. Details of these five aspects are briefly discussed below. By examining behavioral changes of individual public official in terms of these five aspects after systems thinking training, this study expects to improve understanding of whether systems thinking training expands organization members' potentials of enhancing organizational learning. The research results are expected to make two practical contributions. First, the results can provide a reference for governments in considering systems thinking as the core training for organizational learning. Second, better understanding of the barriers to implementing systems thinking in the public sector can help systems thinking consultants or lecturers to improve course design.

Aspects of Organizational Learning

The literature on organizational learning has presented various perspectives on how to build learning capability (Dibella et al., 1996; Goh, 2003; Templeton et al, 2002). This study summarized various aspects of organizational learning based on the related literature and converted them into the following five aspects of examining members' potentials to improve organizational learning.

Clarity of organizational goals

Clear and specific organizational goals help organizational members easily

understand the future desired state of the organization and how these goals relate to their daily tasks. Employee understanding of organizational goals ensures that individual and group learning are oriented towards achieving the same organizational mission and vision. Employees should realize the gap between their daily tasks and organizational mission in an effort to close that gap (Mohrman and Morhman, 1995). An important consideration is how systems thinking can motivate employees to better understand organizational objectives. Systems thinkers believe that system behavior is caused by a system structure involving interrelationships among key system variables, information flow within the system, goals of system participants, system strategies, time delay, and so on (Ackoff, 1994; Rapoport, 1986). Employees who know how to adopt systems thinking should understand that their ways of thinking and behaviors contribute to the generation of organizational status. Consequently, following systems thinking training, employees are expected not only to have increased willingness to realize the pre-set goals of the organization, but also to better comprehend their organizational roles. If systems thinking training exerts this positive effect on employees, organizational learning capability should be predictable.

Leadership

Compared to regular organizational members, the organizational leader is more important than regular organizational members in promoting learning climate. A systems thinker is assumed to help subordinates improve their understanding of how individual behavior can affect overall system operations. To value the importance of subordinates, systems thinkers are willing to empower subordinate participation in decision processes. Leaders who adopt systems thinking should be open to criticism and admit mistakes. Existing strategies that have long been used by a leader can help organizational members recognize their significance and influence in an organization and thus strengthen their commitment to the organization.

Experimentation

Experimentation encourages innovation and allows mistakes. Experimentation may be costly but organizations encouraging research and experimentation may find that it pays off eventually. Private sector organizations are usually willing to invest significant capital in conducting research and experiments to enhance competence and sustainability in the business. However, experimentation is not popular in the public sector owing to organizational inertia. Public officials who are accustomed to their daily routines may not want work that is too challenging owing to a fear of excessive workload. Meanwhile, systems thinkers who value their vital

role in a public organization should be more willing to look into general systemic problems and identify leverage solutions to improve organizational performance. Such situation will be a good opportunity for the public sector to innovate and achieve more effective administration.

Communication

As mentioned above, information flow is part of the system structure determining system behavior. Communication among organization members should be clear and fast so that organizations can operate smoothly and effectively. Effective communication can help organization members share and receive information better and thus reduce the negative effects associated with conflicts and confusion. Systems thinkers are assumed to value communication and be willing to exchange information and share working experiences, even including failure experiences, with colleagues. Effective communications do not necessarily occur in formal situations. In fact, informal communication is sometimes more effective because individuals may be more willing to chat during coffee breaks and similar informal situations. However, communications in the public sector generally assume formal and hierarchical forms. Therefore, public officials with good training in systems thinking should value any methods that can generate smooth and effective communication.

Teamwork and group problem solving

In a dynamic and complex environment, it is hard to reach organizational goals via individual efforts without cooperation among staff. To improve organizational learning capability, the organizational system needs to create appropriate incentives and climate for teamwork and group problem solving. Systems thinking encourages organization members not only to understand their individual roles in the system, but also understand the roles and functions of others in the system. Teamwork can motivate organizational members to share knowledge and increase their understanding of the system functions of other members. Therefore, organization members are expected to have a more macro perspective of the entire system rather than focusing on their own work. Departmentalism is usually one of the main causes of conflicts among different parts of the organization. Teamwork can help organization members breakdown barriers among different parts of the organization.

Research Method

This study employs a questionnaire survey to examine whether public officials

change their thinking and behavior after completing a two-credit systems thinking course. The main contents of the lectures for this course are presented in Appendix I. The research targets were 53 public officials who had taken the systems thinking course offered in the graduate program for the Executive Master of Public Administration (EMPA) of Tunghai University during the past three years. To fulfill the admission requirements for the EMPA program, these public officials should have at least five-year working experiences in the public sector.

This study intended to use e-mail for questionnaire distribution originally. However, given that few students were not familiar with the Internet, the author eventually decided to distribute the questionnaire by mail. Before the questionnaires were mailed out, the author called all respondents to ensure (1) respondent willingness to fill out the questionnaire, and (2) respondent understanding of the purpose of the study.

Most of the questionnaire items are five-point Likert-scale items ranging from 1 (strongly agree) to 5 (strongly disagree). Other items take the form of semi-structured or opened questions. Besides basic personal information such as age and years of public sector working experience, this questionnaire was primarily divided into two parts. One part is developed from the five aspects of organizational learning mentioned above, and the other part involved suggestions regarding future course design. The questionnaire items are listed in Appendix II.

Research Results

The response rate for this survey was 83%. Among the 44 returned questionnaires, 43 of the returned questionnaires were valid. This section reports and discusses the survey results.

Individual Learning Capability toward Organizational Learning

The descriptive statistics results are listed in Table 1. Overall, the mean scores for most questionnaire items are between 1 (strongly agree) and 2 (agree). Obviously, questionnaire respondents tend to believe that their way of thinking or behavior changed following completing the systems thinking course. The two lowest mean scores were A3 (1.35) and C4 (1.49) (please refer to Appendix II). Clearly, after systems thinking training, the questionnaire respondents tend to require organizational leaders to help members better understand the predetermined organizational goals (A3) and to provide incentives for member innovation (C4). Among all the questionnaire items other than leadership items (B1~B4), A2 and C1 are the only two items with mean scores beyond 2. Compared with other items, respondents seem more doubtful regarding whether systems thinking training helps them perceive their importance in

reaching organizational goals (A2) and want to incorporate new ideas into daily routines (C1).

Table 1
Descriptive Statistics of Each Questionnaire Item

Item	mean	median	mode	SD	min	max
(A1) More interested in understanding org. goals	1.88	2	2	0.544	1	3
(A2) Have higher opinion of my ability on achieving org. goals	2.12	2	2	0.662	1	3
(A3) Believe that the leader should provide us with specific notification regarding org. goals	1.35	1	1	0.529	1	3
(A4) More willing to understand the relations between daily work routine and org. goals.	1.81	2	2	0.699	1	3
(B1)* More willing to help subordinates understand the importance of their roles in org.	2.07	2	2	0.458	1	3
(B2) More willing to motivate subordinates to participate in decision-making	2.20	2	2	0.941	1	4
(B3) Encourage subordinates to learn about Systems Thinking	2.07	2	2	0.704	1	3
(B4) More willing to encourage subordinates to challenge my way of problem solving	2.07	2	2	0.799	1	4
(C1) Have increased willingness to apply new ideas to my work	2.00	2	2	0.577	1	3
(C2) Tend to reconsider my existing approach to problem solving	1.86	2	2	0.675	1	4
(C3) Have an increased interest in improving organizational administration	1.72	2	2	0.591	1	3
(C4) More believe in organizations providing incentives to motivate innovation by members	1.49	1	1	0.506	1	2
(D1) More willing to exchange information with my colleagues	1.91	2	2	0.648	1	3
(D2) Appreciate communications with colleagues more than previously	1.81	2	2	0.450	1	3
(D3) More willing to share my experiences of workplace failure with my colleagues	1.58	1	1	0.698	1	3
(D4) More open to criticism	1.98	2	2	0.672	1	4
(E1) Place a greater value on teamwork	1.79	2	2	0.675	1	3
(E2) Believe more in the importance of cooperation for improving organizational performance	1.60	2	1	0.623	1	3

(E3) More willing to contribute to teamwork to achieve organizational goals.	1.72	2	2	0.630	1	3
(E4) Began to believe that I may contribute to causing organizational problems	1.70	2	2	0.513	1	3
(F1) Encouraged my colleagues to understand Systems Thinking	1.98	2	2	0.801	1	4
(F2) Public officials' knowing Systems Thinking can help to improve public sector performance	1.63	2	1	0.691	1	3
(F3)** Systems Thinking does NOT help organizational learning in the public sector	4.26	4	4	0.658	3	5

* Total number of respondents for Item B1, B2, B3, and B4 is 15.

**Item F3 is a reversed question.

Examining individual aspects of organizational learning, besides items A3 and C3, which obtained not only the highest mean scores among all questionnaire items but also individually the lead for the two aspect – clarity of organizational goals and experimentation, D3 (1.58), and E2 (1.60) had the highest mean scores in the other two aspects – communication and teamwork. That is, among the four items related to communication, there was a tendency for respondents to believe that effective information exchanges can improve organizational performance (D3). Moreover, in the aspect of teamwork and group problem solving, systems thinking training appears more helpful in making respondents value teamwork and cooperation.

The questionnaire items related to leadership should be answered by leaders. Fifteen out of 43 respondents identified themselves as leaders. Although the sample was small, the details of the data reveal some interesting findings. The mean scores for items B1, B3, and B4 are 2.07 while B2 equals 2.20. Item B1 asked individual leaders whether after completing systems thinking course, they had tried to make subordinates place a higher value on themselves. Thirteen of 15 answers fell in the ballpark of strong agreement or agreement, and only 2 of 15 (13.3%) were undecided. However, in answering item B2, regarding the involvement of subordinates into decision processes, five of 15 respondents remained undecided and one respondent disagreed. That is, up to 40% of respondents become conservative when they considered involving subordinates in decision processes, despite valuing the importance of every organizational member. These findings may not be surprising owing to the inflexible hierarchy in the public sector.

Item F1 asked respondents whether they did or would encourage colleagues to learn or understand systems thinking, ten out of 43 responded by saying they were undecided while one out of 43 said that they disagreed. That is, 25.6% of respondents remained conservative regarding this question. For questionnaire item F2, regarding respondent opinions about whether systems thinking can improve organizational

performance in the public sector, only five out of 43 (11.6%) respondents were undecided while the others answered positively. Moreover, for questionnaire item F3, soliciting agreement with the sentiment that systems thinking does not improve organizational learning in the public sector, 5 out of 43 respondents were undecided while the remainder answered positively. The results reveal that 11.6% of respondents were unsure how adopting systems thinking can improve organizational performance or organizational learning in the public sector. The barriers to use systems thinking for improving organizational learning in the public sector are indicated by item F4.

Item F4 is a multiple choice question listing seven possible barriers to systems thinking improving organizational learning in the public sector. The seven obstacles include: (1) departmentalism; (2) leader mistakenly believing that organizational learning simply involves employees taking courses; (3) leaders having no idea about systems thinking; (4) leaders not understanding the meaning of organizational learning; (5) lack of organizational incentive to implement systems thinking; (6) organizational inertia in the public sector and (7) other barriers specified by the respondent. Votes for the seven choices are shown in Table 2. Among these seven choices, 34 out of 43 respondents (79.1%) think that leaders are important in applying systems thinking to improve organizational learning. Leaders having no idea about systems thinking is the major barrier to apply systems thinking to improve organizational learning. The other two barriers which obtained over 50% votes were organizational inertia in the public sector (65.1%) and departmentalism (55.8%). Meanwhile, votes for the ‘others’ category mainly stressed that public organizations are usually a closed box which is not open to new concepts such as systems thinking.

Table 2
Votes for Possible Barriers to Applying Systems Thinking to Improve Organizational Learning in the Public Sector

Possible Barriers	Votes	% based on 43
Departmentalism	24	55.8%
leader mistakenly believing that organizational learning simply involves employees taking courses	18	41.9%
leaders having no idea about systems thinking	34	79.1%
leaders not understanding the meaning of organizational learning	17	39.5%
lack of organizational incentive to implement systems thinking	21	48.8%

organizational inertia in the public sector;	28	65.1%
Other barriers (please identify)	5	11.6%

In this study, the author gives greater consideration to respondents who answered disagree than those who answered agree because those negative answers are where this research can locate the obstacles to applying systems thinking in the public sector. Although the answers to all the opened questions are carefully reviewed, for respondents who maintained more negative attitudes towards questionnaire items, this study pays additional attention to their beliefs regarding the difficulty of applying systems thinking to the public sector. Regarding the 11 respondents who do not maintain a positive attitude toward F1, eight think that leader lacking a concept of systems thinking represents a barrier to applying this concept. Furthermore, regarding the five respondents who did not maintain a positive attitude towards questionnaire item F2, four of them believed that leaders lacking a concept of systems thinking represented a barrier for systems thinking in promoting organizational performance in the public sector. Finally, for the five respondents who did not maintain a positive attitude towards F3, four of them believed that leaders lacking an understanding of systems thinking represented a barrier to improving organizational learning in the public sector. Clearly, to help systems thinking practices improve organizational learning, leaders are expected to understand what systems thinking is intended to promote and apply it to enhance organizational learning.

This study also run ANOVA and t-tests to investigate whether age, years of working experience, and whether the respondent is a leader or not have impact on answers of each questionnaire item. The test results do not reject the null hypotheses. No significant difference exist in the answers to each questionnaire item for different age groups, years of working experience, and whether the respondent is a leader or not.

Suggestions to Course Design

Forty-two out of 43 respondents (97.7%) believed that they would wish to enroll in this course again if they had a chance to re-consider their study plans. Although most of the respondents value this course, as mentioned in the previous section, 25.6% of them maintained a conservative attitude towards introducing this course to their colleagues (see questionnaire item F1). Table 3 lists the different results obtained from items F6 and F7. item F6 is a multiple choice question requesting suggestions for improving the course design to enhance respondent job performance. Thirty-two of 43 respondents (74.4%) choose to learn more about real case studies regarding the application of systems thinking to public policy. Other choices such as organizational

learning concepts, systems thinking concepts, and system dynamics model building received considerably lower votes, such as 13 (30.2%), 12 (27.9%), and 10 (23.2%), respectively. However, in answering F7 also regarding suggestions for improving course design but for the reason of suiting personal taste, 23 out of 43 respondents (53.5%) wished to learn more about system dynamics model building. Other choices, such as organizational learning concepts, systems thinking concepts and public policy examples, received similarly low votes, such as 13 (30.2%), 15 (34.9%) and 6 (14%), respectively. Notably, system dynamics model building received the lowest votes for item F6 but the highest votes for item F7. Contrarily, real case study involving the application of systems thinking to public policy received the highest vote for item F6 but the lowest votes for F7. This difference demonstrates that respondents may not consider model building a practical tool for helping them in daily administration tasks, despite being interested in this technique. In fact, based on the lecture experience of the author, these EMPA students generally experienced self-fulfillment in familiarizing themselves with model building software and building a runnable model. However, for daily administration, they may prefer to learn more about real world examples rather than model building.

Table 3
Votes for Suggestions regarding Course Design

Suggestions regarding Course Design	F6	F7
System dynamics model building	10 (23.2%)	23 (53.5%)
Concept of organizational learning	13 (30.2%)	13 (30.2%)
Concept of systems thinking	12 (27.9%)	15 (34.9)
Practical case study for applying systems thinking to public policy	32 (74.4%)	6 (14%)
Other suggestions (Please identify)	0 (0.0%)	0 (0.0%)

* the percentage shaded in grey indicates the total number of votes divided by 43..

For the opened question regarding overall course suggestions, most respondents re-emphasized that the course should introduce more real cases regarding the application of systems thinking to public policy to assist EMPA students in understanding how systems thinking can be utilized in their daily work. Several respondents proposed extending the credit hours for this course to learn more about these professional matters.

Conclusion— Improved Course Design

This study showed that, after finishing the systems thinking course, respondents tend to ask leaders to specify organizational goals and providing incentives for members to innovate. Meanwhile, respondents believed that they considered communication and teamwork to be more important than before taking the course. However, respondents seemed not to strongly value their own role in achieving organizational goals, and also doubted their willingness to incorporate new ideas into their daily routines. Apparently, even if public officials believe that innovation is important in the public sector, a lack of incentives will prevent them from incorporating new ideas into their daily work because new ideas mean increased workload and possibility of failure, neither of which are welcomed in the public sector.

Some 11.6% of respondents were unsure about how adopting systems thinking can improve organizational performance or organizational learning because of various possible barriers, including departmentalism, leader lack of understanding of organizational learning and systems thinking, organizational inertia of the public

sector, lack of organizational incentives, and so on. The survey results indicated that leaders who do not understand the strength of systems thinking may represent a significant barrier to the application of systems thinking to improve organizational learning. Leaders with a high opinion of systems thinking will understand how systems thinking can improve organizational learning and thus create a helpful organizational climate for adopting systems and its implementation.

The above discussions remind lecturers of the importance of identifying the course enrollees or the prospective students before engaging in course design. This study believes that if the enrollees or prospective students comprise leaders, then to make systems thinking even more helpful for improving organizational learning, course design should stress the incentive issue. That is, leaders should understand how to provide incentives for members to become more innovative, and should incorporate these incentives into the system structure. As in the case of Acme Company (Senge et al. 1994: 97-103), organizational learning occurs if incentives successfully change the mental models of members. Additionally, leaders should understand how to make members value themselves to help achieving organizational goals. Course design thus must emphasize the importance of individual members in organizational processes. Only if leader value their members can their members begin to value themselves. The key point then becomes finding a way to teach leaders to value their members. Based on the leadership items, most leaders believe that they have attempted to make subordinates value themselves more. However, up to 40% of leaders are highly conservative in encouraging subordinates to participate in decision-making. If leaders continue telling subordinates that they are important to the organization without granting them more power to participate in decision making, their subordinates will inevitably doubt whether they are truly esteemed. Therefore, besides making leaders understand that all actors and their interactions composing the system structure are vital for generating system behavior, this study suggests that lectures should include more practical case studies to show how to formally or informally involve members in organizational decision processes.

As mentioned above, respondent suggestions regarding course design based on the reasons for improving their work performance and personal interests significantly differ. To improve work performance, this study found that most individuals want more real world examples. However, based on personal taste, most respondents want to learn systems dynamics model building. This result provides a reminder that the purpose of enrollees in taking this course should be considered important for course design. Important questions include what enrollees expect to learn from the course, and whether lecturers should lecture on the fields they feel are important or on the fields that students are interested in learning about. An experienced systems thinking

lecturer may have access to a considerable body of materials, but these materials may not necessarily match the needs of their audience. These questions deserved greater attention in relation to course design. This study suggests that, a systems thinking course, particularly designed based on limited credit hours, can be designed according to a more flexible and contingent format so that enrollees can benefit more from the course and thus develop helpful capacities for improving organizational learning.

Bibliography

- Ackroyd, S. 1995. From Public Administration to Public Sector management: Understanding Contemporary Change in British Public Services, *International Journal of Public Sector Management* 8(2): 19-32.
- Ackoff, R.L. 1994. Systems Thinking and Thinking Systems. *System Dynamics Review* 10(2-3): 175-188.
- Betts, Fan, and Rick Holden. 2003. Organisational Learning in a public Sector Organisation: A Case Study in Muddled Thinking. *Journal of Workplace Learning* 15(6): 280-287.
- DiBella, A, Nevis, E.C., and Gould, J.M. 1996. Understanding Organizational Learning Capability. *Journal of Management Studies* 33: 361-379.
- Goh, Swee C. 2003. Improving Organizational Learning Capability: Lessons from Two Case Studies. *The Learning Organization* 10(4): 216-227.
- Mohrman, S.A. and Mohrman, A.M. Jr. 1995. Organizational Change and Learning. In Galbraith, J.R., lawler, E.E. (Eds.) *Organizing for the Future: The New Logic for Managing Complex Organizations*, San Francisco, CA: Jossey-Bass.
- Rapoport, A. 1986. *General System Theory: Essential Concepts and Applications. Cybernetics and Systems Series, V. 10*. Tunbridge Wells, Kent: Cambridge, MA: Abacus Press.
- Senge, Peter. 1990. *The Fifth Discipline: The Art and Practice of the Learning Organization*. New York: Doubleday.
- Senge, Peter M.; Richard Ross; Bryan Smith; Charlotte Roberts; Art kleiner. 1994. *The Fifth Discipline Fieldbook: Strategies and Tools for Building a Learning Organization*. New York, NY: Currency Doubleday/Currency.
- Templeton, Gary F., Bruce R. Lewis, and Charles A. Synder. 2002. Development of a Measure for the Organizational Learning Construct, *Journal of Management Information Systems* 19(2): 175-218.

Appendix I
Syllabus for the Systems Thinking Course
(2 credit-hours for 16 weeks)
(Major Topics Only)

Major Topics

1. Overview of Systems Thinking Course
2. Beer Game
3. Beer Game Discussion
4. Introduction to Systems Thinking
5. System Archetype I – Conceptual Modeling Practice
6. System Archetype II – Conceptual Modeling Practice
7. Systems Thinking and Organizational Learning
8. System Dynamics Modeling – Feedback Loop, Stock-and-Flow Diagram, Delay, Vensim PLE
9. Model Structure and Model Behavior
10. First-order, Second-order and Higher-order Systems
11. Model Functions
12. Tests for Building Confidence in Systems Dynamics Models
13. Group Model Building (Andersen and Richardson, 1997)
14. Public Policy I – Connecticut School Aid (Richardson and Lamitie, 1989)
15. Public Policy II – New York State Welfare Finance (Lee, 2001)
16. Summary of Systems Thinking

Model Building Assignments:

1. Epidemic Model
2. Kaibab Plateau Model
3. Urban 1—Zoning and Taxing
4. Fish Banks

Appendix II

Questionnaire Items

A. Clarity of Organizational Purposes

- (A1) After completing the Systems Thinking course, I am more interested in understanding organizational goals.
- (A2) After completing the Systems Thinking course, I have a higher opinion of my ability to help the organization achieve pre-set goals.
- (A3) After completing the Systems Thinking course, I tend to believe that the leader should provide us with specific notification regarding organizational goals.
- (A4) After completing the Systems Thinking course, I am more willing to understand the relations between my daily work routine and organizational goals.

B. Leadership: (These questions are for leaders to answer.)

- (B1) After completing the Systems Thinking course, I am more willing to help subordinates understand the importance of their roles in the organization.
- (B2) After completing the Systems Thinking course, I have increased tendency to motivate subordinates to participate in decision-making.
- (B3) After completing the Systems Thinking course, I encouraged subordinates to learn about Systems Thinking.
- (B4) After completing the Systems Thinking course, I have increased tendency to encourage subordinates to challenge my approach to problem solving.

C. Experiment:

- (C1) After completing the Systems Thinking course, I have increased willingness to apply new ideas to my work.
- (C2) After completing the Systems Thinking course, I tend to reconsider my existing approach to problem solving.
- (C3) After completing the Systems Thinking course, I have an increased interest in improving organizational administration.
- (C4) After completing the Systems Thinking course, I more strongly believe that organizations should provide incentives to motivate innovation by their members.

D. Communication

- (D1) After completing the Systems Thinking course, I am more willing to exchange information with my colleagues.
- (D2) After completing the Systems Thinking course, I appreciate communications with colleagues more than previously.

(D3) After completing the Systems Thinking course, I am more willing to share my experiences of workplace failure with my colleagues.

(D4) After completing the Systems Thinking course, I am more open to criticism.

E. Teamwork and group problem solving

(E1) After completing the Systems Thinking course, I place a greater value on teamwork.

(E2) After completing the Systems Thinking course, I believe more strongly in the importance of cooperation for improving organizational performance.

(E3) After completing the Systems Thinking course, I am more willing to contribute to teamwork to achieve organizational goals.

(E4) After completing the Systems Thinking course, I began to believe that I may contribute to causing organizational problems.

-----All of above questions are Likert-scale items -----

F. Systems Thinking Course Design

(F1) After completing the Systems Thinking course, I encouraged my colleagues to understand Systems Thinking. (Likert-scale)

(F2) If every public official knows how to implement Systems Thinking, public sector performance would improve. (Likert-scale)

(F3) Systems Thinking does NOT help organizational learning in the public sector. (Likert-scale)

(F4) What may barriers exist to Systems Thinking assisting organizational learning in the public sector? (Multiple choice)

i. Departmentalism

ii. The leader mistakenly believes that organizational learning simply involves organizing courses for employees.

iii. The leader has no understanding of systems thinking.

iv. The leader does not understand organizational learning.

v. Lack of organizational incentive to implement systems thinking.

vi. Organizational inertia of the public sector

vii. Other barriers (please identify)

(F5) Would you take this course if you had an opportunity to re-consider your study plan?

i. No

ii. Undecided

iii. Yes

(F6) Which part of the systems thinking course would you like to learn more

about to improve your work performance? (Multiple choice)

- i. System dynamics model building
- ii. Concept of organizational learning
- iii. Concept of systems thinking
- iv. Practical case studies involving the application of systems thinking to public policy
- v. Others (Please identify)

(F7) Which part of the systems thinking course do you wish to learn more about to satisfy your personal curiosity (i.e. not related to your work performance)?

- i. System dynamics model building
- ii. Concept of organizational learning
- iii. Concept of systems thinking
- iv. Practical case studies involving the application of systems thinking to public policy
- v. Others (Please identify)

(F8) What are your suggestions regarding future course design? (opened question)