

Entrapping Landmine Structure in Microworlds Formed with Uncontrollable Positive Feedback Loops

Showing H. Young, Associate Professor
Chia Ping Chen, Doctoral Student

Department of Business Management
National Sun Yat-Sen University, Kaohsiung, Taiwan, R.O.C.

Abstract

In studying humanbeing's decision-making in microworlds, there are some researches about humanbeing's cognitive issues in decision-making. There are also some interesting issues on the microworld side. When playing microworlds, players might encounter some underlying structures which are very difficult to deal with. Among these structures, there exist what we called "landmine structure"--buried in the microworld there are a certain hidden dangerous structure, nothing happened if not being bothered, but once step on and being triggered will unavoidably explode wildly and very difficult to rescue. In this research, we are focused on the issue: why some microworlds have much stronger tendency to induce players almost unavoidably be entrapped into a certain helpless landmine structure than other microworlds? We first classified the feedback loops more delicately according to their variance in the pattern of behaviors so that we can have clearer corresponding relationships between structure and behavior. We then studied two of the most famous microworlds, the Beer Game and People Express Management Flight Simulator, as our samples of research. In the Beer Game, almost all the players will be entrapped into the systemic forces formed by some uncontrollable positive feedback loops and felt very helpless. It seemed that the resulting pattern of behaviors were unavoidable to all humanbeings. When playing People Express Management Flight Simulator, players have some more rooms and chances to avoid the landmine structure. Why they are different? When took the catalogue of the feedback loops to analyze both microworlds, we found that there hid some uncontrollable positive feedback loops. If players unconsciously trigger these loops, the behavior of the system will be dominated by these loops and the decision makers just can not do anything to recover the system. How sensitive this type of landmine structure being triggered mainly depends on the discrepancy or "safety distance" between the current state of the system and a certain critical state. For example, in the Beer Game the initial state of the system is very close to the critical state. If the players can not make the current state of the system far enough away from the critical state of "being entrapped" before the small "jump-up" of the exogenous demand, the landmine structure will be triggered unavoidably. When playing People Express Management Flight Simulator, the initial state of the system is far away from the critical state. Thus, if the players can make some right decisions, the landmine structure may not be triggered. The findings of this research should be very helpful in designing some "surprising effects" into microworlds so that some of the intuitive thoughts of the players can be challenged. Some other implications for management issues will also be discussed in this paper.

Introduction
 The evolution of S.D.
 Policy Lab. → Learning Lab.

human being's decision making
 in microworld (learning lab.)

new studying issues

- human cognitive issues
- microworld structure issues

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Uncontrollable positive loops

But
 multi-decision makers
 the control power not in this position
 rigid mental model

let human action lose control

For example:
 the word of mouth, turnover,
 panic, debt, escalation, addiction

-3-

Analysis Tool:
 more refine causal loops
The type of positive feedback loops

Controllable positive loops

Uncontrollable positive loops

-2-

The type of negative feedback loops

three dimensions

eight catalogs

-4-

