

New Barrels for Old Beer: The Beer Game as a Learning Organization

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ABSTRACT

In this paper we describe a modification of the Beer Distribution Game which we have used with MBA students and executives. In this version, we introduce a change in communication rules at the end of week 24. Our game debriefing addresses all of Senge's five learning disciplines and stresses the basic question: how do we deal more effectively with underlying structure? This variation on the usual rules shows a way for designing experiments with the Beer Game to improve our understanding of how organizations learn.

The Beer Distribution Game is one of the most successful designs for conveying one of system dynamics' basic themes: **Structure produces behavior**¹. It provides an excellent illustration of feedback mechanisms and delayed effects of decisions which are key components, though generally misperceived², of most dynamically complex systems.

We have used the Beer Game with MBA students and practicing executives, generating rich discussions about different managerial topics, especially the role of communication and coordination. The largest Venezuelan private sector company's 1992 annual executive meeting provided us an opportunity for trying out a learning experiment with the Beer Game.

Our goal has been to answer a basic question raised by the Beer Game: What can we do to avoid the unhappy consequences of rigid structure and to improve performance? As Senge and Sterman stress: How do we deal more effectively with underlying structure? We have aimed at turning the Beer Game system into a learning organization that takes charge of its future.

A different protocol for the Beer Game: Introducing a breakthrough in communication technology

In our modified version of the Beer Game, we emphasize the impact of communication on performance in a complex system through a simulated information technology change. This allows us to expand our analysis to Senge's five disciplines of a learning organization³. In addition to systems thinking, we broaden the discussion to include team learning, shared vision, mental models and personal mastery.

We follow the usual rules up to the 24th week. Then, we stop the game and announce that a breakthrough in communication technology has just occurred. Thus "through the availability of fax, electronic mail and other means", we declare it is now possible to communicate freely between game participants. The factory can find out what is going on with the retailer's client. The wholesaler is able to follow closely what is happening with the distributor's inventory and beer orders.

When we stop the game to change the communication rules, we ask each team to spend a few minutes evaluating what has taken place to this point and what can be done to take advantage of this new rules. The rest of the structure, shipping delays and execution of beer orders is kept intact. Thus, no acceleration of procedures occurs but complete information is now available at all levels.

In our experiments so far, we have continued to keep demand constant after the 24th week and have stopped the game after completion of the 35th week.

Observed results

Consequences of the "communication breakthrough" are significant. A sense of relief shows up in individuals and teams. Discussions are lively and generally conducting to improved decision rules. Lower inventories and costs are rapidly achieved.

The lesson "structure produces behavior" is stressed. Up to the 24th week oscillations occur as usual but tend to be damped after the communication technology changes. We point out how the change in structure induces change in behavior. Here **systems thinking** is the main point.

Moreover, change in **mental models** can also be observed. Before the 24th week, each individual seems to proceed as if following the heuristic rules described by Sterman⁴ (anchoring the desired stock on the initial value, accounting poorly for the time lags, blaming fellow players for own misfortune). After introducing the communication breakthrough, performance improves greatly and a real opportunity is created for challenging previous understanding of the game. We hypothesize this is what actually happens and we introduce this topic into our discussion.

During the discussion period, leadership issues arise and a **shared vision** becomes possible. Again, we assume performance is improved by developing a shared vision of the team and its work and thus we propose this theme to participants. It is clear by this time, **team learning** has occurred and becomes an important issue.

We have observed how differences among participant's level of **personal mastery** become manifest through their attitudes towards change. There are those who hide away and do not become involved with the game, much less with a change in rules. This can be used, without singling out individuals, for bringing up the issue of personal commitment, rhythm and availability for integration into a group. It becomes apparent that if the team is to create its future within the game, each member must take charge of his own and coordinate actions with his team. This of course can lead the game analysis into themes of a spiritual and ethical nature. Dealing with this topics in depth varies greatly with different groups.

From structure consciousness to structure creation

We believe that a strong underlying force is set in motion every time our version of the Beer Distribution Game is played. As we see it, the modified design allows participants to benefit from the game in two different and complementary ways. In the first part, they experience structure and its behavioural consequences. The second part allows them to change the focus from just being aware of the structure to a structural change. Participants realize they are capable of creating a new structure as a result of their team decision to employ the "communication breakthrough" usefully.

This structural shift comes into being the moment game players choose to explore different means to utilize the improved communication means. They realize that the rules for the first part of the game (the original game rules) constitute a significant component of a limiting and ineffective structure within which it is extremely difficult to optimize game results. A set of team decision rules utilizing the newly available communication means is introduced by them in order to create a structure considered to be better from their own perspective (the facilitators do not intervene in this process). Sometimes teams set their minds into creating game structures purposefully designed to achieve whatever they envision as a successful performance beyond optimizing the numerical results of the game, i.e. team integration and cohesiveness.

Experiencing the ability to generate structural shifts becomes a point of reference for the participants in their learning process. It conveys to them a clear and lively message: structure is not necessarily all mighty - often a team has the power to transform it into a different one of their own creation.

Conclusions

Much work has to be done yet and we invite readers to try our modified version of the Beer Game and variations thereof. We would like, of course to hear from your experiences. Careful designs, similar in rigor to those developed by Showing Young⁵ and his students, have to be tried out to test our assumptions. It provides indeed a rich setting for experiments leading to a better understanding of what it means for an organization to learn and how it goes about it.

Notes

¹ Sterman, John D. Instructions for Running the Beer Distribution Game. D-3679. Systems Dynamics Group, Sloan School of Management, MIT, October 1984.

² Sterman, John D. Modeling Managerial Behavior: Misperceptions of Feedback in a Dynamic Decision Making Experiment. *Management Science*, 321-339, vol. 35, N° 3, March 1989.

³ Senge, Peter. *The Fifth Discipline*. Doubleday, New York, 1990.

⁴ Sterman, John D. *Ibidem*.

⁵ Wang, Sy-Feng and Showing H. Young. A Preliminary Experiment on Examining Thinking in a Meta-Dynamic Decision Making Environment. *Proceedings of the International System Dynamics Conference 1992*, Utrecht University, Utrecht, The Netherlands, July 1992.