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The Deck of Cards

A variation of Deming's funnel experiment

by **Kristin J. Arnold**

I once attended a seminar where we attempted W. Edwards Deming's funnel experiment as described in his book *Out of the Crisis*.¹ Our facilitator's literal interpretation of the experiment was disastrous: The instructions were difficult to follow, marbles were rolling across the tile floor, and the activity took forever.

The purpose of the activity was to demonstrate the harmful effects of overadjusting a process. Unfortunately, we walked away frustrated, confused and unable to grasp the key points. Wanting to improve the process, a colleague and I created this variation to Deming's funnel experiment that is quick, easy to explain and has direct application to your work processes.

What you need

- A room large enough for four teams of two to five to stand and work in small circles.
- Four packs of playing cards.
- Four tape measures.
- Four colored dots to serve as the targets, with one colored dot for each team.
- Twelve colored dots of a different color to serve as the last targeted position for Team B.
- Rule cards for each team.
- Optional: a data collection form for each team.

The process

1. Prior to the session, place one colored dot on the place on the floor where each team will work.
2. Divide the participants into four teams. Tell each to group itself around a dot (target) on the floor.
3. Tell each team the objective is to produce as many products as close to the target as possible, while following a particular rule. Hold up the four rule cards for all to see.
4. Tell each team it produces a product by dropping one playing card from shoulder height. Hint: Drop the card perpendicu-

lar to the target on the floor; this provides the most variation.

5. Hand out one deck of playing cards, tape measure and rule card to each team. Go over the rules for each team:

- **Team A:** Drop every card over the target.

- **Team B:** After each drop, measure the distance (z) from the target to the spot where the card landed. Set the next drop position over the point $-z$ from the last targeted position, which is the last spot you aimed at (same distance, but opposite direction). Use a colored dot to mark the last targeted position.

- **Team C:** After each drop, measure the distance (z) from the target to the spot where the card landed. Set the next drop position over the point $-z$ from the original target.

- **Team D:** Set the next drop position right over the spot where the last card landed.

6. Allow the teams to produce 12 products.

7. Review the distribution of cards with the entire group. Ask the team to share the rule it followed and the results and to speculate about what happened to the process:

- **Team A:** The cards will likely be clustered around the target. The distribution is stable with minimum variation around the target. Even if you have a bad process, you'll get an even distribution. This is a stable process and the best choice.

- **Team B:** The variation explodes and is unstable but symmetrical around the target. The operator knows where the standard is, but adjusts it based on the last piece produced.

- **Team C:** The distribution explodes in opposite directions because the team overcompensated for its errors. This is how most processes become over-adjusted from where the operation was during the last process run.

- **Team D:** The cards will tend to drift because the distribution is unstable and moves away from the target in one direction. This is the kind of process drift that can occur when a process uses the last piece produced as the standard for the next piece, instead of using a universal product standard.

8. Have each team come up with an example of loss in the organization resulting from rules B, C and D.

9. If time permits, start a second round where the teams can make process improvements. Have each team identify one improvement to make, test it and then compare. For example, one process improvement might be to drop the card parallel to the floor. If rule A is used, almost every card will settle on top of the target.

10. Close with a discussion of how organizations take a stable process and try to make it better.

Make sure you do a dry run. The participants will only be able to follow the rules if you know them.

REFERENCE

1. W. Edwards Deming, *Out of the Crisis* (Cambridge, MA: MIT Press, 1986).

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