

The Dot Game

Based on Lean Manufacturing Cup Game:

http://lean.vel.pl/index2.php?option=com_content&task=view&id=85&Itemid=111&pop=1&page=0

Then modified to not use cups.

Purpose

Concepts to be understood:

- How people doing work in front of a bottleneck that adds to the queue of the bottleneck are actually causing problems. The more of this they do the more problems they are causing
- Having too much work in progress adds to the waste of the system and makes it harder to detect and fix problems

Other concepts:

- If there is no productive work you can do, then it is better to do something outside of this value stream that you can complete on your own – this can include any of the things people always want to get to but never have time – however, it cannot create new work in progress that will create delays in another value stream.

Materials Required (see figure 1 – except forget the cups!):

- 3x3 yellow post-its (enough packs for 300 stickies)
- 3/4 inch round assorted color dots: (3 Packs)



Figure 1: the materials needed for the software factory game.

Instructions

We used to play this game with multiple groups. An alternative is to have one game going on and everyone else observing. This takes 8 participants, and the rest are observers. If you have more than 25 people or so, you can have a group of 8 for every 25 participants as it gets difficult to observe if there are more people than that. However, I have successfully run this game with 30 observers. If you want to run as many games as possible it is useful to have a few observers spread amongst the teams.

This game is significantly simpler than the original cup game.

The game is played in 3 rounds, each lasting about 20 minutes – 5 minutes prep, 5 minutes running the game, 10 minutes group discussion (where the real learning takes place).

The purpose of the game is to complete software features, which are defined to be 1 yellow post-its in it that has 6 colored stickers in the following pattern/order:

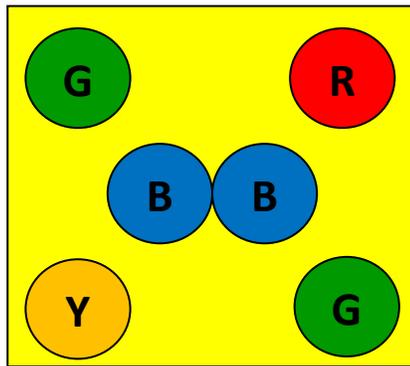


Figure 2: Each “done” post-it represents contain a completed “feature”—3x3 yellow post-it with dot stickers placed in the correct location.

There are very many ways to run this game and they all tend to work. My favorite is to make an example of the desired stickie on a white board and tell them this is what you want. Draw it imperfectly (the outer dots touching the edge, for example). Then, when they do the game, they certainly won’t get it right. You can then discuss acceptance criteria during the discussion. However, people typically don’t get it right even if you give them an exact example.

The last two pages of this document are the student instructions. Print 7 copies, single sided of these pages to give to each participant so they can orient the second page with the way the sit. Everyone gets a copy but the customer.

Players:

1. Business Analyst
2. Technical Analyst (Can combine BA and TA if needed)
3. Designer
4. UI Developer
5. Developer
6. Tester

7. Project manager (must have a watch with a second hand).
8. Customer

The rules change each round.

Round 1

Push. Strict hand-off, big batches (6), testing last.

Round 1 Details: Have all the materials on each table, and have each of the “roles”, other than the customer, arranged around the table in a U order (see figure 3).

Designer	IN AREA (materials)	UI Developer
Technical Analyst		Developer
Business Analyst		Tester OUT AREA

Figure 3: Roles around the table

Instructions to give participants

Each role has an “in” area and an “out” area. None of the roles are allowed to talk to each other about quality. If stickers are falling off, it is up to the tester to “discover” the defects and place them in the defective pile. NOTE: This was the original rule but I have been finding that not stating this rule has people not talk about quality in any event. The fact that they are not instructed to not talk about quality and they still don’t is pretty illuminating.

In round one, the work proceeds as follows:

- 1) BA picks 6 post-its and passes them to the tech analyst
- 2) Tech analyst puts on the yellow dot
- 3) Designer puts on red dot
- 4) UI Developer puts on green dots
- 5) Developer puts on blue dots
- 6) Tester tests – puts in defect area if things don’t look like figure 2.

- 7) Project manager times:
 - a. Time it takes for first batch to be completed
 - b. Warns team when there is one minute left
 - c. Tells team when time is out (after 5 minutes)

You can have some fun if you act like a manager telling people to focus on their work and not worry about other people. That if each role works hard and does the best it can that has to result in the best costs. If each station has the lowest cost then the overall cost will be lowest.

Basically, everyone is to work as fast as they can and not worry if they are being kept up with. They are being measured on how *they* are doing, not the total throughput.

To start things off, tell the customers to come to you and tell the team to get going. While the teams are working, tell the customers that they will not accept anything where the blue dots are overlapping or not touching. Also, if the dots in the corner are not fairly evenly spaced from the two sides, they can reject those as well. Tell the customer to respond to people when asked but not to volunteer information.

NOTE: Be sure to tell observers that they can only observe. They should not communicate to the participants. If they talk amongst themselves they have to do so in a way that no participants hear them.

At end of round 1

After 5 minutes, have the customers say how many of the features are accepted. Have the PM total the following:

- 1) # of completed post-its
- 2) # of accepted post-its
- 3) # of post-its that are in progress (WIP)

A normal team will get about 3 batches of 6 “done” in 5 minutes. Depending on how mean the tester is they might pass none or all, but the “customer” will probably accept 0.

Stop here and discuss how long it took for each team to get any completed work (i.e. the first batch done). It should be around 2.5-3 minutes, so notice “cycle time” that was first measured was 3 minutes. HOWEVER, this is a great time to revisit $CT = WIP/TP$. Here, TP would be 18 (ignoring pass/fail). If they are like most teams, bottlenecks begin to occur during the 5 minutes, and they might have 60 post-its on the table. So in this case:

WIP: 60

TP: $18/5$ minutes = 3.6 post-its per minute

$CT = WIP/TP = 60/3.6 = 16.7$ MINUTES (not 3 like we measured for the first batch)!!

This is an important point of emphasis, that the first batch was done in 3 minutes, but our bottlenecks are making it rise as more and more WIP gets opened!!!!!!

Round 2:

I recommend some discussion before revisiting and doing round 2. Talk about minimizing WIP, pull, and smooth flow, and how it helps productivity AND quality at the same time. Emphasize that in round 2 we are going to “slow down to speed up”!!!!!!

Set it up again, but let them do one-piece flow. Still need to have each person do their own role.

OPTIONAL: Can change the requirement but don't need to. They will likely validate things quickly now so even with this delay results will be better. But don't need to do this. Make it sound like the requirements are the same, but go ahead and establish for the whole group that quality matters, and the blue dots have to be perfectly touching in the middle make the requirements be the corner dots have to touch the ends of the post-it as shown in figure 4.

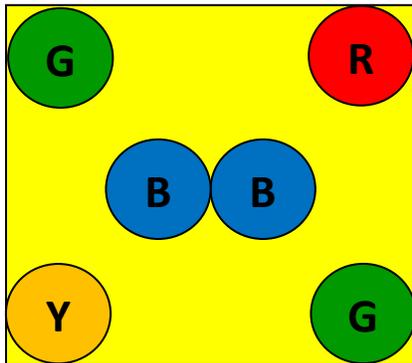


Figure 4.

In a three segment offering, round two should just do 1-piece flow. Don't allow smoothing. See what happens. Then, in round three allow for smoothing. If this is the last round, then let them do what they want.

Suggest that they smooth the flow by balancing out the number of dots, and if anyone “frees up” from reorganizing, they can help “test”. Discuss “in-place” testing, and how there should be little or no opportunities for failing final testing. People will almost certainly ask the customer this time (tell them it is ok to answer questions).

Do same timing and recording.

This round, the first post-it should come through in about 20 seconds!

Since we are doing 1 piece flow, and emphasizing “finish before you start”, WIP should be 2-4 at most!

Teams can usually get at least 24 done, even with slowing down to get the dots right.

The first postit will come through about 20-25 seconds. Note that without bottlenecks, it should actually start to decrease, so have the PM measure several post-its end-to-end during the 5 minutes.

Now revisit the calculation!!!!

WIP = 2

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Round 1:

Push. Strict hand-off, big batches (6), can only do your own work, test last.

Details: Have all the materials on each table, and have each of the “roles”, other than the customer, arranged around the table in a U order (see figure 3).

Figure 3: Roles around the table

Each role’s table has an “in” area and an “out” area. A person can only do work defined by their role, they cannot do the work of another role.

Each role should work as fast as they can. Don’t worry if the person next to you isn’t keeping up.

Also, remember you are working in batches – do 6 at a time and hand off all 6 at the same time.

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 - d. Make sure you don't stop your watch – most important is timing 5 minutes

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Round 2 and Round 3 have no handouts.

The Dot Game – Handout to Participants

(intentional duplicate)

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