Lean Design Game

Trainers manual

1. **Preface**

The trainer should read this manual carefully before playing the Lean Design Game in order to maximize the learning effect for the participants. This text explains how to play the game. It contains useful guidelines for the trainer.

* 1. **Necessaries**
* Computer with MS Excel and MS PowerPoint
* A loudspeaker with cables to connect it to the computer
* A beamer with cables to connect it to the computer
* A projection screen
* A whiteboard with whiteboard markers and magnets
* At least 10 tables and chairs
* 10 ballpoint pens
* 8 calculators
* All printed game documents for each of the 3 game rounds
  1. **Preparations round 1**
* Arrange the classroom as follows:

Team board

Projection screen

Computer

Customer Service

Add-ons

Compound drawing

Refrigerator

Container

Spoiler

Chassis & wheels

Cabin

Important aspects:

* Every participant should have a clear view on the projection screen and on the team board
* To improve participants involvement in the game, tables and seats are arranged in such a way that participants can as much as possible watch the whole process.
* Further, it is important that container, spoiler and refrigerator design departments are not next to each other so that oral communication is discouraged. During the game they have to exchange information using mail documents.
* Print following documents
  + Team board headers
  + Department identification signs
  + Instruction sheets round 1
  + Instruction sheets round 2
  + Instruction sheets round 3
  + Design sheets round 1 (6x)
  + Design sheets round 2 (6x)
  + Design sheets round 3 (6x)
  + Platform 1 dimensions
  + Platform 2 dimensions
  + Platform 3 dimensions
  + Customer orders round 1 (each 5x)
  + Customer orders round 2 & 3 (each 3x)
  + Refrigerator catalogues
  + Mail template
  + Communication plan template
* Install computer, beamer and loudspeaker
* Switch on the computer and open document ‘LDG Dashboard-v<i>.xlsm’.
* Turn the white board into a team board using the team board headers.

|  |  |  |  |
| --- | --- | --- | --- |
| **TEAM BOARD** | **Round 1** | **Round 2** | **Round 3** |
| **KPI’s** |  |  |  |
| Committed cost |  |  |  |
| Design throughput time |  |  |  |
| # designs too late |  |  |  |
| # mails sent |  |  |  |
| # redesign steps |  |  |  |
| # designs-in-progress |  |  |  |
| # design errors |  |  |  |
| **Problems** |  |  |  |
| **Improvement actions** |  |  |  |

* Put department identification signs on the right tables (see classroom layout) and fix them with some transparent tape.
* Put the design instruction sheets for round 1 on their corresponding table.
* Put the materials listed on the instruction sheets on that table.
* Invite the participants to take a seat and sit down.

1. **Round 1**
   1. **Introduction to the game**

* Start the introduction of the game using document ‘LDG introduction-v1’
* Provide 1 minute for the participants to read their instruction sheet.
  1. **Test order**

Before starting the game, launch one of the 9 orders arbitrarily as a test order. Coach every participant with his/her tasks. Ask them whether everything is clear and invite them to ask for clarifications. Emphasize that participants may only determine the dimensions of their own part. If they need information (dimensions, mounting alternatives,…) about other parts, they have to ask it by sending the other design department a mail using the mail template.

* 1. **Start round 1**
* Start the game by clicking the ‘Start’ button in the Excel document ‘Dashboard LDG-round 1-v<i>.xlsm’ on the tab named ‘Start spelronde’.
* Launch a new design order each time a countdown timer arrives at 0:00:00 and the Excel document generates a computer beep.
* During the game, supervise and check whether all participants precisely follow the instructions described in their instruction sheet. Keep an eye on the use of the described mail system and prevent oral communication.
  1. **Feedback moment 1**
* Collect the measured KPI values and write them on the team board.
  + The Excel document generates
    - Average design throughput time
    - # designs too late
    - # designs in progress
  + Average committed cost is calculated as the average of the committed cost values of all finished designs.
  + # sent mails = # mails on the filled-in mail templates. Collect them and count them. Be careful: In most mail documents you will count 2 mails, one for the question and one for the answer.
  + # redesigns and # design errors are summed up by each design department.
* As soon as all KPI values are on the team board, compare the values with their target value and ask participants to formulate problems. Each time a target is not met, there is a problem that should be solved.
* Problem by problem, ask for solutions. Let participants generate the solutions. To help them, ask specific questions:
  + Questions leading to the introduction of platforms:
    - What can we do to reduce the average design throughput time?
    - Is it efficient to start each order from scratch? What else can we do?
    - What do you see when you compare the 9 available orders?
    - Are some orders similar?
  + Questions leading to the use of Quality Function Deployment (QFD)
    - How many platforms should we create?
    - How do these platforms look like? What are the parts belonging to a platform?
    - Has every product feature the same value for the customer?
  + Questions leading to standardization of refrigerators
    - Can all refrigerators from those 3 catalogues be used?
    - What is the advantage of reducing the number of different refrigerators to choose from?
    - What can we do to reduce the number of different refrigerators to choose from?
    - Is it necessary for each new order to calculate the required cooling power?
* Use the PowerPoint ‘LDG support-v1.pptx’ to illustrate the introduction of platforms, to explain the use of QFD and to show how to create a limited standardized set of refrigerators that meet all needs.
* Write on the team board as improvement actions for round 1:
  + Platforms determined using QFD
    - Impact 1: less design departments
    - Impact 2: less redesign work
    - Impact 3: less design errors
  + Standardization of supplies (refrigerators)
* Do all participants understand what was happening and why we introduce these improvement actions? Ask them! What improvements do they expect? Which KPI’s will be affected by these changes?

1. **Round 2**
   1. **Preparations round 2**

* Remove everything from the tables except the department identification signs and the blanc mail documents.
* Eliminate the chassis & wheels design department and replace the cabin design department by the predesign department.
* Distribute the design instruction sheets of round 2 over the tables.
* Put all materials mentioned on top of the instruction sheets on the corresponding table.
* Arrange the classroom as follows:

Team board

Projection screen

Computer

Customer Service

Refrigerator

Container

Spoiler

Predesign

Compound drawing

Add-ons

* 1. **Test order**

After a short break, invite the participants to take a seat and sit down. Pay attention: this game intents to illustrate the measures that lead to a more efficient design process. Improvements due to routine should be eliminated. That’s why each round participants have to choose to do another task.

Before starting the game, launch one of the 9 available orders arbitrarily as a test order. Again, coach every participant with his/her tasks. Ask them whether everything is clear and invite them to ask for clarifications. Highlight what has changed compared with round 1.

* 1. **Start round 2**
* Start the game by clicking the ‘Start’ button in the Excel document ‘LDG Dashboard-v1.xlsm’ on the tab named ‘Start spelronde’.
* Launch a new design order each time a countdown timer arrives at 0:00:00 and the Excel document generates a computer beep.
* During the game, supervise and check whether all participants precisely follow the instructions described in their instruction sheet. Keep an eye on the use of the described mail system and prevent oral communication.
  1. **Feedback moment 2**
* Collect the measured KPI values and write them on the team board.
  + The Excel document generates
    - Average design throughput time
    - # designs too late
    - # designs in progress
  + Average committed cost is calculated as the average of the committed cost values of all finished designs.
  + # sent mails = # mails on the filled-in mail templates. Collect them and count them. Be careful: In most mail documents you will count 2 mails, one for the question and one for the answer.
  + # redesigns and # design errors are summed up by each design department.
* Compare the KPI values of round 2 with their values of round 1. Ask the participants to explain why these values improved:
  + The average design throughput time is now lower. Thanks to the use of platforms, the design process has not to start from scratch anymore.
  + The average committed cost is also lower because of the lower average design throughput time and the standardization of supplies (refrigerators).
  + The other KPI’s also improved. The use of platforms and the standardization of the refrigerators reduce the risk of making errors.
* Again, compare the KPI values of round 2 on the team board with their target value and ask participants to formulate problems. Each time a target is not met, there is a problem that should be solved.
* Problem by problem, ask for solutions. Let participants generate the solutions. To help them, ask specific questions:
  + Questions leading to standardization of communication:
    - With which activity do we still loose a lot of time?
    - Is it possible to know in advance which information is needed by each design department?
    - Is it possible to deliver these data earlier to those design departments?
  + Questions leading to postponing design decisions (Set Based Concurrent Engineering):
    - Are our final designs optimal?
    - Are you sure no better designs are possible?
    - Did we try and evaluate alternative designs until now?
    - Can we decide on the best possible design in advance and without making calculations?
* Use the PowerPoint ‘LDG support-v1.pptx’ to explain the standardization of the communication process and to show how Set Based Concurrent Engineering works.
* Write on the team board as improvement actions for round 2:
  + Standardization of the communication process
  + Postponing decisions (Set Based Concurrent Engineering)
* Do all participants understand what was happening and why we introduce these improvement actions? Ask them! What improvements do they expect? Which KPI’s will be affected by these changes?

1. **Round 3**
   1. **Preparations round 3**

* Remove everything from the tables except the department identification signs and the blanc mail documents.
* The layout and names of design departments doesn’t change.
* Distribute the design instruction sheets of round 3 over the tables.
* Put all materials mentioned on top of the instruction sheets on the corresponding table.
  1. **Test order**

After a short break, invite the participants to take a seat and sit down. Pay attention: this game intents to illustrate the measures that lead to a more efficient design process. Improvements due to routine should be eliminated. That’s why each round participants have to choose another task.

Before starting the game, launch one of the 9 orders arbitrarily as a test order. Again, coach every participant with his/her tasks. Ask them whether everything is clear and invite them to ask for clarifications. Highlight what has changed compared with round 2.

* 1. **Start round 3**
* Start the game by clicking the ‘Start’ button in the Excel document ‘LDG Dashboard-v1.xlsm’ on the tab named ‘Start spelronde’.
* Launch a new design order each time a countdown timer arrives at 0:00:00 and the Excel document generates a computer beep.
* During the game, supervise and check whether all participants precisely follow the instructions described in their instruction sheet. Keep an eye on the use of the described mail system and prevent oral communication.
  1. **Feedback moment 3**
* Collect the measured KPI values and write them on the team board.
  + The Excel document generates
    - Average design throughput time
    - # designs too late
    - # designs in progress
  + Average committed cost is calculated as the average of the committed cost values of all finished designs.
  + # sent mails = # mails on the filled-in mail templates. Collect them and count them. Be careful: In most mail documents you will count 2 mails, one for the question and one for the answer.
  + # redesigns and # design errors are summed up by each design department.
* Compare the KPI values of round 3 with their values of round 2. Ask the participants to explain why these values improved:
  + The average design throughput time is now lower. Due to the standardization of the communication process, design departments receive the information they need without having to ask for it.
  + The average committed cost is now lower because now we first calculate the committed cost of some alternatives and then we choose the cheapest one.
* Use the PowerPoint ‘LDG support-v1.pptx’ to summarize the learning points discovered by the participants. Ask them: “What did you learn during this game? What will you keep in mind for your current and future professional life?