

THE ER DESIGN SIMULATION GAME: EXPERIENCE AND REFLECT

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1 THE PROBLEM

The construction design phase is characterised by a discontinuous flow of information due to:

- the lack of or uncertainty in information
- iterative work flow due to new decisions by some actor
- specialized work tasks distributed on many actors preventing balancing of flow

The aim of this research is to develop and test a design simulation game that explains these design principles. The game is named the ER design game to signal that Experience and Reflection are the targets, but also to bring attention to the urgency of understanding a process that sets the limits for downstream operations.

2 METHOD

The ER design game was developed as tweaking of an existing game where a production sequence was simulated. The original game had the following features:

- the production of 20-40 "products" consisting of LEGO® plates with pieces arranged in different patterns according to colour
- a known order sequence of products
- a fixed product design in five variants produced in a workflow with five stations
- the possibility to balance work between work stations

The design staff who played the original game collectively expressed that "this was an interesting game, but it does not visualize our reality". As a response to that, the author suggested "OK, so let us change it and see if we can illustrate our point". Through workshops and test runs, five persons collectively created a new version of the game.

3 RESULTS

3.1 The lack of information

In the design phase, the lack of information is a constant problem. To illustrate this in the ER design game, parts of the product description was hidden to the players, shaded blue in the figure. The obscured information was released using an action card, issued after 3, 6, or 9 minutes into the game. An action card could read "We have decided that windows should have a new colour, please unlock areas labelled 1". In the first round people were eager to get new knowledge to move forward. In the third and last round, the complexity was so high with iterative work being re-worked that the players met the release of new information with resistance, stating "We don't need anything more to do right now, please be quiet!".

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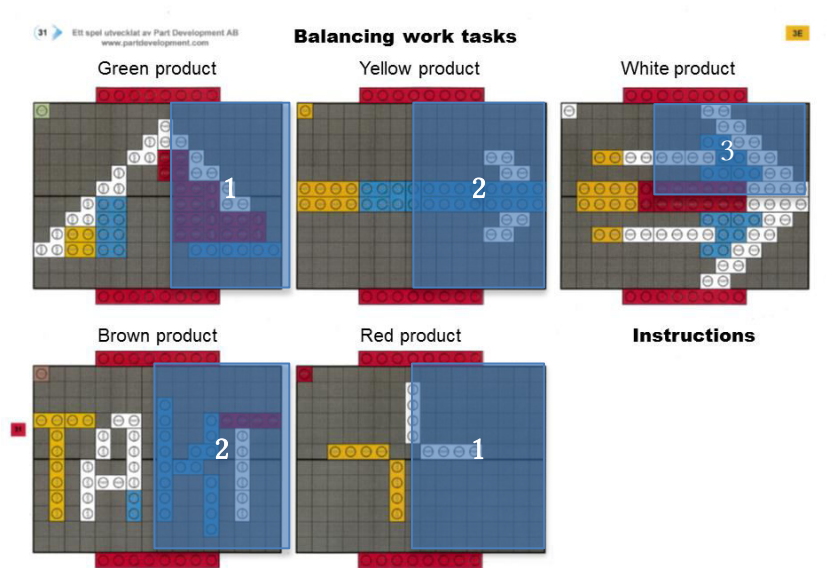


Figure 1: ER design game set-up

3.2 Iterative work

Iterations are sometimes necessary, but stifle flow of information. To illustrate iterations in the ER design game, the action cards were not only releases of new information but also contained instructions about design changes. As change orders were introduced, the flow decreased and communication between participants increased. "If you redo your blocks, I'll go after you" was a comment showing the need for renegotiating the work sequence on the fly. The constant calibration with the surroundings is typical for design work to avoid rework and stay tuned with the overall progress.

3.3 Specialized work

Specialization was emulated by restricting a single player to attach e.g. blue blocks. If a change order in the ER design game requested that all blue blocks should be doubled, no one else in the game could complete that change order but the person assigned the blue blocks. The result was that the entire team at times was waiting for a single player to complete his/her task before delivering to the client. The team in the game was instructed to have a 'computer server' where the products in the game were stored while waiting for the next player to do his/her part. It emerged very early in the course of the game that someone needed to keep track of the order of products on the server, thus unintentionally demonstrating the need for 5S.

4 EXPERIENCE AND REFLECTIONS

Some reflections from the test runs of the game validate the purpose of the game: "How are we supposed to know what product to work on? There is no sequence." shows that the lack of a clear flow in design was noted. "This is easy, I complete my work at even pace." changed to "I should never have said that this was easy! Now I am behind all the time." when the person all of a sudden was commissioned with reworking his task. The uneven, iterative nature of design is captured in this situation caused by a specialization in work tasks. "What did you say? What was the change order?" shows that change orders need to be well specified and the risk for information loss is high.

