Virtualizing the Obeya

Knut Aasland
NTNU
Dept. of Engineering design and Materials,
N-7491 Trondheim, Norway
knut.e.aasland@ntnu.no

Detlef Blankenburg
NTNU
Dept. of Engineering design and Materials,
N-7491 Trondheim, Norway
detlef.blankenburg@ntnu.no

Abstract

The Obeya is known as part of the Toyota Product Development System and Lean Product Development. Literature describes the Obeya as one of the tools of the TPDS, but rarely discusses what really makes an Obeya work, and what the critical aspects of it are.

In an EU-sponsored project on distributed, collaborative design, LinkedDesign (EU project no 284613 FoF-ICT-2011.7.4), a virtual Obeya has been identified as one of the subgoals. In order to specify such a solution, we need to examine thoroughly what Obeya is, how it is used, what functionality must be covered, and what virtualizing the Obeya concept means. This paper presents a concept for virtual Obeya.

Keywords: Lean product development, Distributed work groups, Computers for collaborative design.

Introduction

The Obeya term

Obeya – Japanese for "large room" – is a term used in connection with project work in industry. Its origin is in the G21 project at Toyota in the 1990s, a project which led up to the first generation Prius [1]. At the onset of this project, Takeshi Uchiyamada was appointed Chief Engineer for the project. He felt overwhelmed by the knowledge of his discipline leaders, and felt that he lacked the necessary authority to make the optimal decisions for the project as such. He therefore needed the support of the other discipline leaders whenever he had a decisive discussion with one of them [2].

In order to achieve this, he instituted the "large room" – Obeya – as an arena for all his discussions with the discipline leaders. In this room, the other discipline leaders would be present, and documents and data would be available to all.

Due to the success of this in the G21 project, it was taken up by the Toyota organization, and after a while made a standard part of the Toyota Product Development System [3] in Japan and abroad. Figure 1 shows the Obeya at the Thailand premises. By then, a number of standards for the Obeya had been found. The documentation, for instance would be on A3 sheets on the wall, each sheet representing a problem, decision, idea or – more precisely – all

necessary information, across disciplines. The A3 format represents a simplified and condensed format for information communication. Thereby, all information would be brief and concise, and all present in the room would have easy access to the necessary insight in the cases.

So the original Obeya was a room for project management.

However, as time progressed and experience was gained, the room was used for more than management. Typically, technical discussions between disciplines would take place in the Obeya, and this meant that more information would have to be present. It therefore became custom to post all important information in the room.

Objectives behind Obeya

What should the Obeya achieve? A levelling of management influence is obvious, but by today's standards, by no means enough.

As with all methods and techniques for product development, the two overall objectives are:

- Efficiency of the development process, and
- Quality of the resulting product (quality as in "having the right properties" [4])

In the case of Obeya, both objectives are considered crucial. In this paper, we will focus on the first point and look into what efficiency in development is, and how the Obeya can contribute to it. Among a number of factors promoting efficiency, the following are important:

Figure 1 The Obeya of the IMV project at Toyota Thailand *(from [3])*

Rapid decision-making
In a setting where all relevant people have access to the same information in a condensed format and accessible to all, decisions are more easily made, and therefore take less time.

Reduction in rework and reconsiderations
This is where the potential for time saving is most obvious. Rework, in the form of iterations, is an important part of all development work. This is natural and should be so, but must be kept at as low a scale as possible. Hitting a dead end or an insurmountable obstacle often sets the project back weeks and months. The costs of this can be considerable, but even more severe is the risk of missing the product delivery date. It can possibly mean a missed launch window, and this can have serious economic consequences, and even if it doesn't, a delayed introduction will mean lost sales.

Reduction in unnecessary discussions
In development work, creativity, idea generation and discussions are core activities, and therefore crucial. So discussions are a good thing. What isn't, is discussions over and over about things that have already been clarified or decided. That is pure waste of time and brainpower. And the Obeya is a way to reduce such waste. When everybody have access to the same information at the same time, and important discussions take place with participation of all relevant people, then the discussions will tend to be done with and dealt with at the right time, and not repeated with new people over and over again. It is believed that this also leads to better decisions as a result of the broad involvement.

Requirements
In order to prepare for the development of a virtual Obeya, we need to find out what requirements must be placed on an Obeya for it to work according to the objectives. This analysis has not been done yet, but will take place in the next stage of the project.

Different rooms and perspectives of an Obeya

In order to understand the Obeya and what makes it work, we have examined other types of such big rooms. Our understanding of the Obeya is that it represents a combination of many of these rooms, that is it includes the functionality of many (if not all) of them. We can therefore regard these rooms as aspects of the Obeya, although they originated as separate concepts.

Over time the term "Obeya" has been used for many different views and perspectives regarding the product development process. The following types of "Big Rooms" have been identified:

- War Room [15]
- Work Room
- Meeting Room
- Discovery Room [13]
- Sharing Room
- Workflow Room [14]
- Management Room

Those "rooms" have different purposes and can be specified along different perspectives. Each of them can be characterized from these 5 perspectives [7]:

- Action and duration of action perspective - when and how long action takes place
- Recordings perspective - how long recordings for passive viewing are taken
- Problem and task perspective - in which way tasks and problems are treated

- Participation of functions and people perspective - which functions and how many people are present
- Information / data perspective - how much information is available

These types of rooms and the perspectives are described thoroughly in [7].

Aspects of a Virtual Obeya

In previous work with implementing Obeyas in design and development departments of industrial companies, the authors have recognized certain particular aspects that are crucial to achieving the positive effects of an Obeya. As such industry internal improvements are usually regarded as sensitive information by the companies, we have not published these observations, and we have not found much published by others either. But some of the paramount aspects are discussed in the Toyota literature, for instance [1]. When combined with requirements and possibilities posed by the technology connected with computers and networks, we end up with a set of crucial aspects of a virtual Obeya.

Visual

A major aspect of all these rooms and all of our work is the focus on visual perception (as part of visual communication), which means the ability to interpret information and surroundings from the effects of "visible light reaching the eye" [From Wikipedia, the free encyclopaedia]. By that we mean the use of pictures, graphs, colours, objects and what else makes it possible to grasp complex relations of many different factors in a blink of the eye. Even though reading is also based on visual perception, very few people are able to read an entire page in a glimpse (an ability most often found in autistic people).

The use of colours, graphics, and symbols provides clear and unambiguous information that can be understood in a heartbeat. Visual management is based on visual perception, and is generally regarded as a clear, simple and effective way to organize and present work. It can also be perceived as fun, since visual elements bring colour and life into an otherwise "boring" office environment. Another benefit of visual management – often overlooked – is that it can positively influence the behaviour and attitude of team members, managers and stakeholders, for example, by helping build transparency and trust.

"Information Radiator" is a popular term invented by Alistair Cockburn that is used to describe any artefact that conveys project information and is publicly displayed in the workspace or surroundings [5]. Information radiators like "Task Boards" or "Big Visible Charts" are very popular in the Agile world (the computer science equivalent of Lean product development). But there are also less obvious items like "lava lamps" and stolen street lights as project health indicators [6].

The importance of the visual aspect is as strong in the virtual Obeya as in the physical Obeya and that is valid for all the different rooms. The visual aspect has been discussed in the previous chapter.

Physical

Product development is still a human activity that depends also on the physical interaction of the team members with each other. Showing postures, illustrating handling and other human interaction with the product are examples of necessary physical interaction. Physical artefacts can also be valuable to relating information and understanding issues. So it is necessary to carry over the physical aspects of the Obeya into the virtual world. One should only use

virtual solutions when logistics or other issues cannot be resolved in any other way. Even then, the basis should be a physical Obeya used by a physically co-located subteam.

Virtual
An early discussion on virtualization of Obeya-like rooms is given by Kirsh [8].

The reality of most project teams is that developers may be spread out over several time zones, and may also include outside contractors and key suppliers. Today many different tools can be used to achieve various benefits of a physical Obeya also in the virtual world. Customized virtual tools such as "Visio" look much like a physical wall-Gantt. A set of drag-and-drop stencils are available for use by the team during their virtual stand-up meetings. Real-time interaction is possible through on-line webcast applications. In this way, each team member can interact and make their modifications (i.e., move, add, or remove sticky notes) in real time.

Other tools like "GoToMeeting" can help to facilitate a virtual stand-up meeting in a similar way as a collocated one [9]. Once the meeting is over, it is possible to print out a physical copy of the board to post on the wall at all involved locations, or simply provide big screens for the same purpose.

Although some virtual approaches come close to physical implementations, there is no substitute for the personal interaction of team members. Cyberspace doesn't change human nature. Gathering a project team several times per week for face-to-face discussion and planning has benefits at many levels, not the least of which is the building of team identity and emotional commitment. As hard to define as they may be, a great team leader recognizes these intangibles, and makes the most of them whenever possible. A virtual project board may be easy, but having team members see each other face-to-face is the most powerful "visual" management tool there is. [10]

Realization of a Virtual Obeya

The very most crucial part in the realization of a virtual Obeya is the combination of the aspects of visual, physical and virtual. There are few places where those aspects are discussed in combination with each other. One of them is the "Physual Designing™ conceptual framework" that integrates physical arenas and virtual tools in a visual collaborative environment capable of supporting collocated teams and individual contributors engaged in tight synchronous collaboration. That framework is compatible with a wide range of available collaborative technologies and is used to develop recommendations that are based on a fundamental understanding of key dimensions that, when orchestrated, can contribute to improved collaborative effectiveness and competitiveness. [11].

Physual is a term that refers to a combination of physical, virtual and visual. Physual designing supports collaborative effectiveness and efficiency in teams through a combination of a physical arena, a virtual workspace and selected computer peripherals. The physual designing network is a portal that enables shared access to all resources necessary to engage in collaboration in any team, any time, from any place. The term physual has been coined by Kjetil Kristensen [12] to describe the "virtual/physical continuum".

A virtual Obeya needs to take those kinds of frameworks into consideration but is expected to reach longer, but how far and in which direction? They only thing we know is that we need it.

Major findings in a survey among 43 oil and gas companies regarding collaborative work environments (*CE*) are as follows [16]:

- Collaborative environments are mission critical.
- Audio and video conferencing and data sharing are the most important functionalities today, but many respondents find the applications difficult to use.
- Current and anticipated use is higher than expected. More than 75% of users expect to see more collaborative environments in their corporations, and in excess of 30% work in CEs more than 6 hours per week.
- Integrated operations and related concepts are reaching a stage of maturity.
- The major challenges often lie within the organizational structures.
- Multi-purpose CEs are increasingly becoming popular.
- The failure rate of CEs is still too high.

The challenges of distributed work groups

There are two main challenges of distributed work groups. The most obvious one is the geographical distance, which makes person to person contact without electronic media impossible, and which makes it so much more of a challenge to share prototypes, models, test samples and to a certain degree also information. The effects of this distance are well-known and well-documented.

The other challenge only applies if the work group is distributed over different time-zones. We then see that some sub-groups work while others sleep and vice versa. This is a special challenge for people who should work closely together. We can say that they work asynchronously.

A third challenge is cultural differences. This adds to the information required, as one cannot suppose that the recipient has the same background as oneself. Language also belongs to this challenge. We will not go into this third challenge here.

The virtual Obeya concept

Realizing a virtual Obeya means to realize a "room", which is not a physical room, but exists only on the net. The virtual Obeya must carry over most of the functionality of the physical obeya. This means that it should allow:
- person to person communication
- seeing each other's computers
- posting and reading posts
- updating as new things happen

In order to realize this, we need to relate to visual as well as auditory information.

The visual aspect means that we must have functionality for seeing other participants "live" through video. This is functionality which is available in commercial videoconferencing systems as well as in public domain software like Skype. For a virtual Obeya to work properly, we probably need many cameras, but again, this is no problem as they are common as part of computers.

The other functionality which is required is the possibility to see posted information at a later stage. This includes all kind of information, but in a traditional Obeya, information should be posted in A3 sheets, so a first step could be to realize functionality for storing, retrieving and displaying such sheets. It is, however, a point to take advantage of the added possibilities afforded by the computer medium, so multimedia content should be handled.

The auditory information handling must let participants talk to each other – again, not a problem, as this is a function of all conference systems – but also must allow storing (or posting) of spoken information, and retrieval of it.

Together, these functionality requirements specify much more than can be realized based on single persons with their own PC sitting in separate offices. Much more it points towards a set up of a physical, "traditional" Obeya at the main site, possibly additional physical Obeyas at major remote sites, and the possibility for single persons to take part via their own PCs possibly with some extra equipment. The physical Obeyas would not be traditional, as all information posting should be net-based, no physical A3s. A solution with large, full-wall displays combined with smaller displays for special purposes can be envisioned. A multitude of cameras will be required, for display of persons, but also for documents and physical objects.

Loudspeaker could probably be used more intelligently than just one channel out. Multiple channels for different used are envisioned. Loudspeaker could be supplemented by headphones.

Microphones are the easiest issue, since they can be tiny and placed on all participants.

Conclusions

This work is still in the introductory phase, but we have so far identified the important functions of an Obeya and have begun the work on specifying a virtual Obeya. When that is finished, we will start a traditional development process, which should lead up to a final solution by the end of the LinkedDesign project. If successful, this will make it possible to realize the benefits of the Obeya concept also in projects which are geographically distributed, and projects where multiple companies cooperate to design and develop new products.

Acknowledgement

References

[1]   Morgan, J. & Liker, J., "*The Toyota Product Development System – Integrating people, process and technology*", Productivity Press, New York, 2006

[2]   Liker, J., "*The Toyota Way – 14 management principles from the world's greatest manufacturer*", McGraw-Hill Professional Publishing, Blacklick OH, 2003

[3] Osono, E., Shimizu, N. & Takeuchi, H. "*Extreme Toyota: Radical Contradictions That Drive Success at the World's Best Manufacturer*", John Wiley & Sons, New York, 2008

[4] Mørup, M., "*Design for Quality*", PhD dissertation, Denmark's Technical University, Lyngby, 1993

[5] Cockburn, A., "*Agile Software Development: The Cooperative Game*", 2nd edition, Addison-Wesley Professional, 2006

[6] Perry, T., "Task Boards: telling a compelling story", *http://agiletools.wordpress.com /2007/11/24/task-boards-telling-a-compelling-agile-story/*, 2007

[7] Aasland, K. & Blankenburg, D. "An analysis of the uses and properties of the Obeya", *Proceedings of the 18th International ICE-Conference on Engineering, Technology and Innovation*, Munich, 2012 (accepted for publication and presentation)

[8] Kirsh, D., "Adaptive Rooms, Virtual Collaboration and Cognitive Workflow", *Cooperative Buildings: Integrating Information, Organization, and Architecture – Lecture Notes in Computer Science*, vol 1370, pp 94-106, 1998

[9] GoToMeeting, Web conferencing, *http://www.gotomeeting.com/fec/*, Citrix Online, 2012

[10] Mascitelli, R., "*Mastering Lean Product Development: A Practical, Event-Driven Process for Maximizing Speed, Profits, and Quality*", Technology Perspectives, 2011

[11] Kristensen, K., "*Physual Disigning: A Supportive Framework for Dispersed Engineering Design*", PhD dissertation NTNU, Trondheim, 2003

[12] Kristensen, K., Hildre, H., Sivertsen, O. & Røyrvik, J., "Physual Designing Network - Addressing Inter-layer Collaboration in Dispersed Teams", *Proceedings of the 10th International Conference on Concurrent Enterprising*, Seville, 2004

[13] Arth, M. & Claremon, L., "The Discovery Room", *Curator: The Museum Journal*, vol 20, no 3, pp 169–180, 1977

[14] Allue, X., "Readability and the Thick Black Marker", *http://www.xqa.com.ar /visualmanagement/2009/07/readability-and-the-thick-black-marker/*, 2009

[15] Mark, G., "Extreme collaboration", *Communications of the ACM - Adaptive middleware*, vol 45 no 6, pp 89-93, 2002

[16] Kristensen, K., "The future of collaboration – a survey of collaborative work environments in the oil & gas industry", *http://www.kristensenconsulting.com /Default.aspx?ID=4*, 2008