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Designing the Object Game

Collaborative reflections and knowledge sharing in action

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Chapter 6.

Designing the Object Game: Collaborative reflections and knowledge sharing in action

Diane Filip and Hanne Lindegaard

Abstract

The Object Game is an exploratory design game and an experiment of developing a tangible object that can spark dialogue and retrospection between collaborative partners and act as a boundary object. The objective of this article is to show and elaborate on the development of the Object Game, and to provide case examples of the game in action. The Object Game has two parts – *Story-building* and *Co-rating of objects* – with the aim of stimulating a collaborative reflection on knowledge sharing with different objects. In *Story-building*, the participants visualize their knowledge sharing process with *Story-cards* by taking the outset in the five meta-objects – Project Proposals, PowerPoint slides, Excel spreadsheets, Meeting places, and an object of own choice. In *Co-rating of objects*, the participants engage in a dialogue and collaboratively rate each of the five meta-objects in relation to how these facilitated *knowledge transfer*, *knowledge exchange*, *knowledge generation*, and *knowledge integration*. The participants collaboratively reflected on their use of different objects for knowledge sharing and learn which objects have been effective (and which have not been effective) in their collaborative innovation project. Finally, we look ahead to the design of a *Co-alignment game* – a future-oriented Object Game playing with possible futures.

Keywords: Design Game, Design-game-designers, Boundary objects, Collaborative innovation, Knowledge sharing, Knowledge integration

1. Introduction

There is a growing need of establishing possible collaborative practices across organizational and institutional boundaries. Involving individuals with various competences and interests is challenging, and exploratory design games based on participatory design provide designers and facilitators with frameworks and tools to tackle this (Brandt, 2006). The objective of this article is to show and elaborate on the development of the Object Game, and to provide case examples of the game in action. The Object Game is an exploratory design game (Brandt, 2006) and an experiment of developing a tangible object that can spark dialogue and retrospection between collaborative partners and act as a boundary object (Star and Griesemer, 1989; Carlile, 2002).

The Object Game functions as an alternative technique to gather data from key individuals in, and to develop new insights on, collaborative innovation projects. This is a supplement to the retrospective technique of interviewing – a method for engaging the participants to reflect on their collaboration, more specifically the objects used and how those supported the process of knowledge sharing.

The main motivation to develop this type of context-specific game with a specific purpose is to gain an understanding of how the different participants in collaborative innovation projects used objects to share knowledge, as this was not well highlighted in the interviews conducted before the development of the Object Game. Design games and tools emphasize tangibility and visualization, with the underlying concept that “thinking with the hand is a way to reach a richer learning experience” (Gudiksen et al., 2014; 17), and provide the opportunity for mutual learning (Brandt et al., 2008). The Object Game is meant to be both a research method and a boundary object as it unfolds the *how* in a collaboration (e.g., Nicolini et al., 2012), and thus a tool for mutual learning on the *how* of objects in knowledge sharing for collaborative innovation.

In this article, we start by outlining the purposes and functions of design games and participatory innovation, and then we describe the designing process of the Object Game and its use as a research method. We then present the elements of this retrospective tool and discuss the creation of meaning in two case examples by illustrating the game in action. We conclude by discussing the Object Game in relations to exploring existing practices, and we look ahead to a design game exploring possible futures.

2. Purposes and functions of design games and participatory innovation

Design games exploring ‘as-is-worlds’ and ‘as-if-worlds’ are tools to involve participants in designing existing practices or designing practices of possible futures (Brandt et al., 2008). Design games in codesign can be viewed as a tool, as a mindset, and as a structure (Vaajakallio and Mattelmäki, 2014). Competition is not the core element of exploratory design games; on the contrary, participants collaborate to complement each other’s skills and competences, and do so in a game with rules and tangible game pieces (Brandt, 2006). It is about creating a common understanding of the development task (Brandt and Messeter, 2004). Brandt and Messeter (2004) build on Schön’s work (1983) and argue that “constructing scenarios is a design move in the sense that it restructures the current situation to provide new insights” (p.121).

Exploratory design games and board games have the quality of formatting design dialogues (Brandt et al., 2008). The materials aim to support making, telling and enacting, and the visual and tangible components create a platform for a shared focus of attention to establish and maintain dialogues (Vaajakallio and Mattelmäki, 2014). Vaajakallio and Mattelmäki argue that design games offer structure for design game designers, as the games have “tangible design game materials that are explicit while open to reinterpretation, rules and performance roles that can be manipulated depending on contextual needs” (2014; 69). Facilitators can apply design games to orchestrate codesign by engaging multiple stakeholders to express, negotiate and generate a shared understanding of users and contexts (Vaajakallio and Mattelmäki, 2014).

Authors in participatory design emphasize that “designing the process itself is just as important as designing the artefact” (Brandt, 2006; 57). In this article, the process itself is the knowledge sharing process between actors from various organizational or institutional boundaries engaging in collaborative innovation projects. The artefact is the motivation for the collaboration and what triggers it (e.g., Nicolini et al., 2012). An artefact in this context could be tangibles and intangibles in different types of innovations, i.e. product, service, or process innovation. The design game developed and presented in this article is an exploratory design game, the Object Game, which is inspired by the User Game that had the intention to help participants develop a shared image of the intended users grounded in the field data (Brandt et al., 2008).



Figure 1. The storyboard with five meta-objects at the center.

2.1. Context and purpose of the Object Game

The novelty of the Object Game, and the twist as compared to the User Game, is that the participants playing the Object Game are the intended users themselves; and, the data collected through interviews and documents are about the participants themselves. Therefore, the aim of the game is that the participants gain a shared image of their (past) collaboration process, which in turn can give them valuable insights to future collaborative projects. The participants design the knowledge sharing process themselves, as well as negotiate a shared meaning about how different objects have supported knowledge sharing between them and other stakeholders. The main objects – the *meta-objects* – are Project Proposals, PowerPoint slides, Excel spreadsheets, Meeting places, and an object of own choice. The five objects placed on a game board – *Storyboard* (figure 1) – are described in a later section.

The act of collaborating with external partners is a form of organizational innovation, where the boundary practice (Akkerman and Bakker, 2011) is incorporated in collaborative innovation projects, which is a mechanism for integrating external knowledge (e.g., Bengtsson et al., 2015). How to manage such collaborative projects, where participatory innovation (Buur and Matthews, 2008) is at heart, is a challenge in itself, as the core assumption in participatory innovation is that various actors contribute to innovation (Buur et al, 2013). Small and medium-sized firms (SMEs) collaborating with academic researchers pose such a challenge, as the actors come

from different 'social worlds' and engage an 'arena' of in-between (Strauss, 1978). This leads to a (possible) transformation of knowledge (Carlile, 2002) and a transformation resulting in profound changes in the practices between the boundaries involved (Akkerman and Bakker, 2011). Real dialogue and collaboration between 'flesh-and-blood partners' at either side of the boundary is essential for transformation and the possible creation of new boundary practices (Akkerman and Bakker, 2011; Engeström et al., 1995). Moreover, design games and tools for designing the process of collaboration may have the power to align expectations and goals of participants from different 'social worlds' (Strauss, 1978) and 'thought worlds' (Dougherty, 2002).

But how can exploratory design games engage participants in a dialogue and interaction to establish a shared image of past or existing practices? And how can we investigate the participants' interpretations of the objects-in-use (Lindberg and Walter, 2013) supporting knowledge sharing for collaborative innovation?

3. Designing the Object Game for collaborative reflection of existing boundary practice(s)

After studying a several collaborative innovation projects between small and medium-sized firms (SMEs) and academic researchers, it became evident that objects play a central role in the knowledge sharing process. The curiosity on how the objects were used for sharing knowledge between different actors started a quest for a better understanding of 'boundary objects' (Carlile 2002; Star and Griesemer, 1989; Star, 2010) and 'objects-in-use' (Lindberg and Walter, 2013), which are objects enacted into being and have specific functions (Law and Singleton, 2005; Lindberg and Walter, 2013). This goes along with Star's argument that "people act toward and with" objects and that their "materiality derives from action" (2010; 603). This could possibly mean that a given object could be used for – or *enacted into being* – one particular function in a certain situation and another function in a different situation, and this is worth investigating further.

Objects then must play a role – and the interesting questions were *what* kind of objects, *how* did the different kind of objects interact, and *how* did the project partners use them?

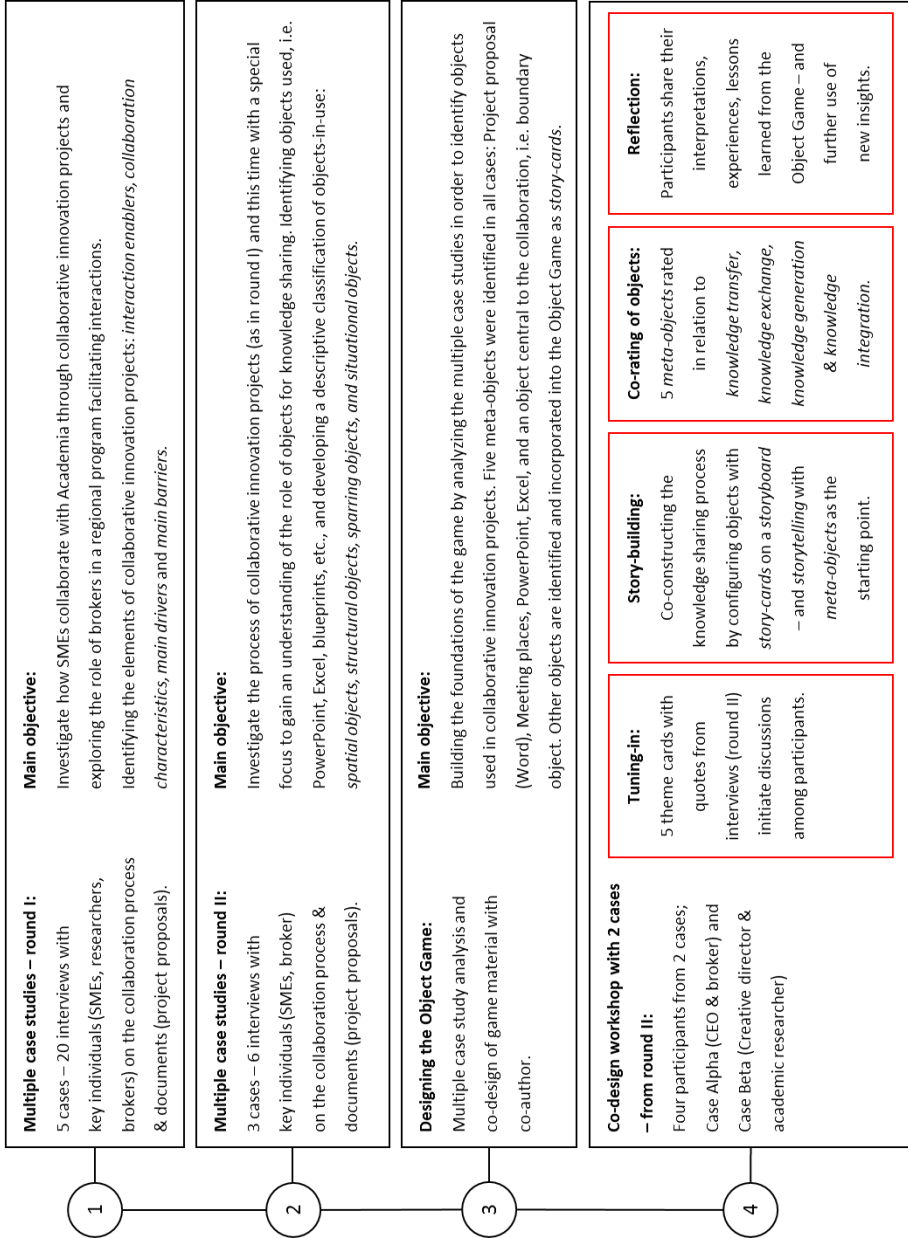
3.1. The quest for a 'new' method

The first author has as part of the research interviewed the participants (key individuals) about their use of objects for knowledge sharing, and this was limiting and insufficient. The interviewees described their usage, but details on *how, who, where, when, and why* were not well articulated through mere conversations in one-on-one interviews. The understanding of how objects were used in the specific context of the interviewee's case was blurred; the interviewed key individuals had at times trouble remembering how he or she had used specific objects in their collaborative projects. The discussions were rather superficial on the topic of objects. Perhaps the notion of objects and their role in knowledge sharing is difficult to grasp through the retrospective technique of interviews, especially when only conducted with one key individual at a time. The interplay between actors and objects was 'lost in translation' – or should we say lost in retrospective description.

This then started a process where questions like these came into play: Is there another method for capturing the interplay between people and objects in knowledge sharing processes? Would it be possible to identify objects through case studies and then incorporate those into a new method? Can a method be designed such that participants of collaborative projects can reflect on their knowledge sharing process through dialogue? Can a relatively simple tool be developed in order to grasp the context in which the most important objects are used in for knowledge sharing?

The search and experiment began, and the first author got inspired by fellow researchers in the participatory design field and especially the development of *design games*. Wanting to untangle design games, the first author initiated a partnership with the co-author in order to develop a method – a board game – and utilize the strengths of visualization and tangibles to encourage dialogue between the actors. Inspired by 'exploratory design games' and 'user games' (Brandt and Messeter, 2004; Brandt, 2006; Brandt et al., 2008), we co-developed the Object Game with the intention of exploring 'as-is worlds' of existing practices (Schön, 1983; Brandt et al., 2008) as an experiment of using the game as a research method. In this case, the existing practices are boundary practices (Akkerman and Bakker, 2011) in collaborative innovation projects.

Figure 2. The development and design process of the Object Game and structure of the co-design session (next page)



3.2. The development and design process of the Object Game

Figure 2 describes the process of developing the Object Game – the layout of the illustration is inspired by Vaajakallio and Mattelmäki (2014). The development process included multiple case studies (round I and round II), followed by the development of a descriptive classification – four S' of objects-in-use. The Object Game is based on multiple case studies, e.g. eight collaborative innovation projects. Each project constitutes of one SME, one or more academic researchers, and an independent third party.

As illustrated in *figure 2*, the co-design session (e.g., workshop) contained four parts: *Tuning-in* is a warm up followed by the two parts of the Object Game; *Story-building*; *Co-rating of objects*; and, finishing with *Reflection* at the end of the session. These elements are described in later sections.

3.3. Choices made and reflections on the game material

In the designing process of the exploratory design game, choices were made along the way. First, the game had to include elements from the cases, therefore objects identified in the case studies. Second, the participants of the game had to include the CEO or a top manager and their external partner in their collaborative project. Third, the game materials needed to resemble some 'known' game, such as board games with tangible pieces, though with a professional design signaling that this game is not just for the fun of playing games but has a specific purpose. The design of the game should help the participants to reflect retrospectively.

When designing the game board and game pieces, we were inspired by the User Games with Moment-cards and Sign-cards (Brandt and Messeter, 2004; Brandt, 2006; Brandt et al., 2008). We chose a design of a game board that would signal a common ground for the participants, as well as a board with a center circle: Starting at one spot and going around – closing the loop – and thereby signaling a 360-degree dialogue. We call this game board the *Storyboard* as this is the platform where the dialogue takes place, and where a story is built through collaborative reflections on their knowledge sharing practices with different objects.



Figure 3. Early version of game pieces (left) and an example with final version of Story-cards (right).

As for the game pieces, we wanted to make sure that the participants had not played with similar pieces before in a business setting; therefore, we explicitly chose not to use LEGO and Post-its. For the *Story-building*, we chose colorful carton with images and text (figure 3). The sizes of these cards was also of importance, as many cards would be placed on the game board, and there needed to be space to line them up. These cards – the *Story-cards* – are different types of objects that are divided into six categories: *Who? Where? How? What? Why? When?* (i.e., category-cards). Each category with its own color and category-card (see figure 4 in a later section). Using different colors makes it visually easier to distinguish between the categories (assuming the participants are not colorblind). Each card represent a piece of an overall story to be told – by combining the story-cards on who, where, what, how, why, and when.

In the designing process of *Co-rating of objects*, we discussed using elements that were easy to place, steady (unlike pearls), and that had no food resemblance, so we excluded possible candidates like pasta, beans, M&M's (chocolate candy). We decided to go with something more neutral yet colorful: orange and blue mosaic stones (see figures 7 and 8 in a later section). The board for the *Co-rating of objects* also needed to be one platform (a matrix) where the participants could have a dialogue and interact with the game materials.

4. Using the Object Game as a research method

The primary aim of developing the Object Game was to use it as a research method in an attempt to understand combinations of different objects and their role in knowledge sharing. This game is a way to simplify a complex innovation process and

to capture (part of) the complexity of the interplay between individuals and objects. This study is based on the co-design session and conversation analysis (Buur et al., 2013) where the researchers facilitate experiments in participatory design workshops – co-design workshops (Vaajakallio and Mattelmäki, 2014) – to engage participants in testing collaborative tools (Gudiksen et al., 2014). Other researchers have used co-design techniques or participatory designs, i.e. improvisational theatre, as a research method in order to understand the emergence of meaning through conversation and real dialogue, especially the quality of the conversation between participants with crossing intension (Buur and Larsen, 2010).

In a half-day workshop, the participants used the Object Game to retrospect on their collaborative project, and to reflect on how they – through different objects – have shared knowledge. At the end of the session, participants engage in a reflection to share their lesson learned and to evaluate the elements of the workshop. The workshop-session is video recorded for visuals, including photos, on dialogue and interactions between participants. Audio recordings in combinations with video recordings and photos are used to capture the meaning of the participants themselves as they interact and create ‘meaning’ with the pieces of the game. Nonetheless, as this is an experiment built on other authors contributions to the literature on exploratory design games and participatory design (e.g. Brandt, 2006; Vaajakallio and Mattelmäki, 2014), its simplicity might just highlight the complexity of knowledge sharing processes in collaborative innovation projects. Hence, this only carves out a fraction of human interaction supported by objects – and not reveal the full picture.

4.1. Developing a classification of objects in knowledge sharing processes

Prior to the co-design workshop, a descriptive classification describing the attributes of objects-in-use was developed. This classification is the *four S’ of objects-in-use* consisting of *structural objects*, *spatial objects*, *sparring objects*, and *situational objects*²⁷. The Object Game itself is a *sparring object* in the four S’ of objects-in-use classification. A boundary object describing the *how* of the collaboration, but does not explain what triggered or fueled it (e.g., Nicolini et al., 2012). It only eludes to the fact that the primary boundary object of the collaborative project is the object worth the most to the participants – the *situational object* – the object of own choice in the Object Game.

An abstract categorization of knowledge sharing processes as four types of knowledge flows is used in the co-design workshop. The four types of knowledge flows²⁸ are defined as follows: 1) *knowledge transfer* as a one-way flow, 2) *knowledge exchange* as two-way flow, 3) *knowledge generation* as the creation of

²⁷ See chapter 7, table 1, for definitions.

²⁸ For a description of the four types of knowledge flows, please refer to the theoretical lens in chapter 3 or chapter 7.

new knowledge, and 4) *knowledge integration* as the capture newly generated knowledge. These represent the movement or creation of new knowledge to be captured into the firm's existing or new processes, products, or services. This categorization is integrated into the second part of the Object Game – *Co-rating of objects* – to explore how the participants interpret the role of the five main objects (i.e., *meta-objects*) in supporting the different types of knowledge flows in their collaborative projects.

5. Elements of the Object Game – a retrospective-reflection tool

As Albert Einstein once said, “*Everything should be made as simple as possible. But not simpler.*” There is a fine line between, on one hand, designing a game that will capture the most important aspects, and on the other hand, making it too complex for the participants to understand. This game is based on the specific contexts of collaborative innovation projects studied in the multiple case studies of a Danish regional program 2011-2014 – *Genvej til Ny Viden* (Shortcut to New Knowledge). Therefore, the *tuning-in* in the workshop (*figure 2*) as a warm up for (and not part of) the Object Game included five theme cards²⁹ with quotes from the interviews in round II: 1) Knowledge-based collaboration, 2) Chemistry, 3) Dialogue & Interaction, 4) Knowledge, and 5) Innovation.

Overall, the Object Game has two parts – *Story-building* and *Co-rating of objects* – with the aim of stimulating a collaborative reflection on knowledge sharing with different objects. The following sections introduce the various elements of the game: *Meta-objects*, *Story-building*, and *Co-rating of objects*.

5.1. The Meta-objects

Each collaborative innovation project is unique; however, some objects reoccur in all eight cases, including *Project Proposals* (written in Word), *PowerPoint slides*, *Excel spreadsheets*, *Meeting places*, and an *Object* that is at the center of the collaboration. The latter is a boundary object that, as Nicolini et al. (2012) state, has the capacity to explain what motivates and fuels the collaboration. Most objects fall in the category that facilitate collaboration but does not trigger (Nicolini et al., 2012), including the first four objects. The five objects are referred to as *meta-objects* as the interconnectivity and interplay between different objects and individuals will be displayed by starting with one meta-object at a time (*figures 1, 5 and 6*); starting with *Project Proposals*, followed by *Meeting Place*, *PowerPoint*, *Excel*, and ‘*Object of own*’ choice.

²⁹ The five theme cards are presented in *Appendix F*.



Figure 5. The Story-cards were placed on one table (left) and the Storyboard with Story-building on another table (right). The participants co-created their story of existing practices through dialogue and interaction.

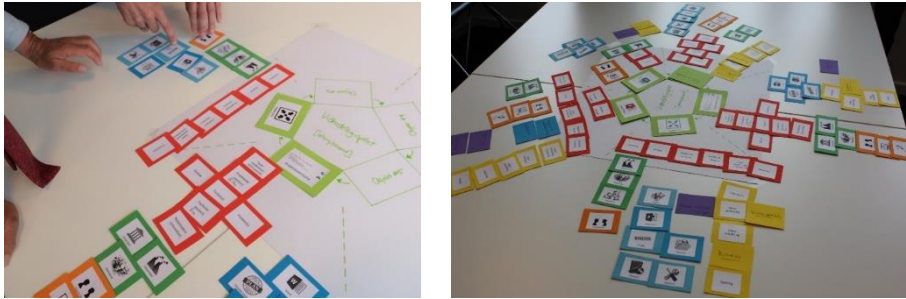


Figure 6. Example of Story-building: In action (left) this is the platform sparking storytelling (right).

5.3. The Co-rating of objects

The second part of the Object Game – *Co-rating of objects* – is a matrix (figures 7 and 8). The purpose of *co-rating of objects* is to make the participants reflect on how the five meta-objects support knowledge sharing – and to which degree. Participants, through dialogue, in collaboration rate each meta-object by placing colored stones in the matrix (platform). To the left in the matrix (vertically), the five meta-objects are placed (figure 7), and horizontally the four types of knowledge flows are rated according to *knowledge transfer*, *knowledge exchange*, *knowledge generation*, and *knowledge integration*. These four types may occur parallel and may be iterative. Definitions of the four types are provided on cards next to the co-rating of objects platform. Each object can score from zero to five stones: 0=not relevant; 1=low degree; 2=lesser degree, 3=some degree, 4=high degree; and, 5=very high degree.

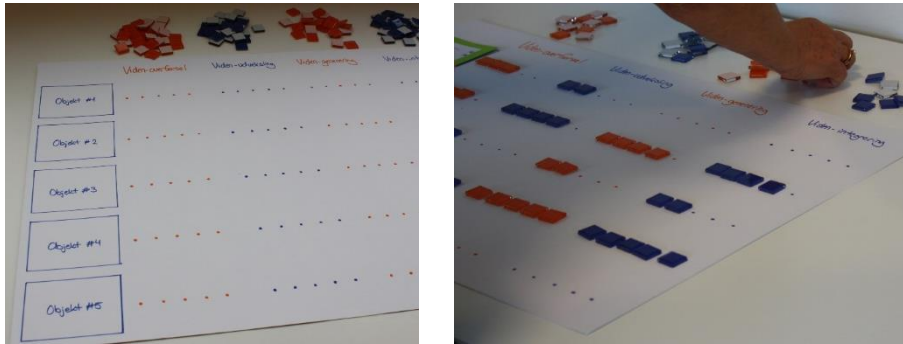


Figure 7. The Co-rating of objects: Meta-objects to be placed in the empty space (left) and co-rating in action (right).

6. Dialogue and interaction to establish meaning

We have thus far described the process of developing and designing the Object Game, and we have presented the tangible elements of the game. However, to understand the participants' interaction with the elements of the game, we present in the following sections two cases – *Case Alpha* and *Case Beta*. Transcripts from the workshop provide a better understanding of the Object Game, *Co-rating of objects* (see figure 8) in action, and through conversation and interaction analysis, we describe the emergence of *meaning* of a given object through dialogue (Buur and Larsen, 2010).

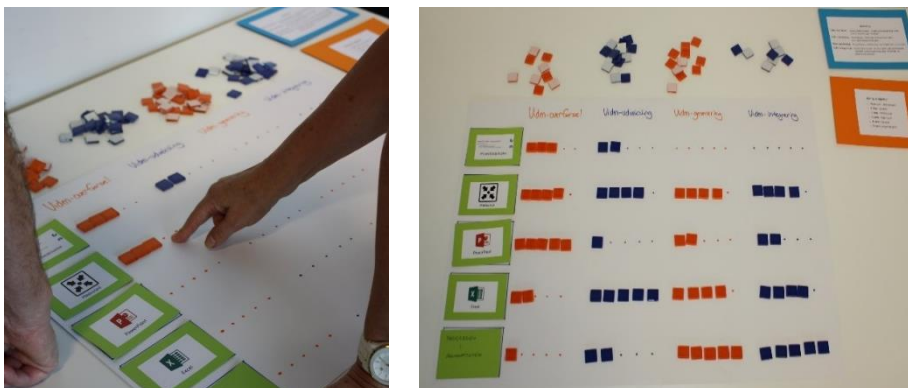


Figure 8. The Co-rating of objects: Participants in Case Alpha engage in a dialogue when placing tangible pieces (left) and a finished example of this activity (right).

6.1. Co-rating of objects: Case Alpha on 'Excel'

Case Alpha is a collaborative innovation project between a manufacturing firm (SME), Danish and German researchers, and a broker (with a role of an external project manager). Case Alpha focused on process innovation and the two representatives of Case Alpha were the chief executive officer (CEO) (A) and the external project manager (B). By following the two participant's dialogue and interaction during the workshop, and later analyzing the audio of their conversation, we can see that the creation of meaning is supported by examples from real life, moments of retrospection, and confirmation from the other participant.

In Transcript 1, we observe that the two participants of Case Alpha use real life examples to support the abstract categorization in the *Co-rating of Objects*, and thus how many stones should be placed at each category of knowledge sharing. In order for the participants to make the object more tangible, they relate to Excel as an object for placing test results, and articulate real life examples on how individuals have interacted with this object.

Transcript 1.

Case Alpha: Dialogue and interaction on 'Excel.' (Transcript is translated from Danish.)

A: Excel. Well, there were test results placed there.

B: Yes. There was, in fact, a lot here.

(Places some stones at knowledge exchange)

Right?

A: Yeah, it was knowledge exchange...

B: Exchange... I would actually place...

(Places 5 stones at knowledge exchange)

... because [Researcher] could not have finished, if [X] had not received the results from you.

A: No, No...

B: There, I would almost do like this...

(Places 2 stones at knowledge transfer)

A: Yes. No more on that one.

B: No.

A: And then there was... Was new knowledge generated? Yes, there was...

B: Yes, there was a lot! So compared to...

A: Well, there we need to place some, as well.

B: It did. Yes...

(Places 4 stones at knowledge generation)

Well, there were some aha-moments related to filling these out or when used as tools...

A: You could also see, which cutting data you could use.

B: Yes, exactly!

A: And there was also some knowledge integration.

B: Yes. I would almost give it five here... since it is probably this one that has created the most...

(Places 'only' 4 stones at knowledge integration)

A: Yes.

B: Because it is also visualized! And because they worked with it themselves [the workers]

In the dialogue, *A* relates to Excel as an object with test results, and this is confirmed by *B*, and goes on to place maximum number of stones at *knowledge exchange* and support this action by giving an example, "... because [the Researcher] could not have finished, if [X] had not received the result from you," which is acknowledged by *A*. Another example when the co-rating is supported by real life example: *B* strongly confirms that knowledge has been generated knowledge and gives an example, "Well, there were some aha-moments related to filling these out or when used as tools..." *A* builds on this example and elaborates on the object as being a visual tool for practical use, "You could also see, which cutting data you could use," and *B* agrees with this statement, "Yes, exactly!".

The participants realized, through their own reflection on their use of objects in specific situations, that individuals inside the firm and external to the firm have interacted with this particular object to transfer and exchange information, in order to generate this information into context-specific knowledge, and thereafter integrating it through the active use.

6.2. Co-rating of objects: Case Beta on 'PowerPoint'

Case Beta is a collaborative innovation project between a service firm (SME), Danish researchers, and a broker (with a role of facilitator) – a case focusing on service innovation. The two representatives of Case Beta were the creative director (one of two owners) (*C*) and academic researcher (*D*). The transcript is an example of a dialogue and interaction between the two participants, which through conversation and interaction analysis from video and audio recordings, illustrates the implicit understanding and interpretation of the given object in question – PowerPoint.

As we observe in Transcript 2, the dialogue between the two participants in Case Beta is rather implicit in the sense that their interpretation of the object in relation to the four abstract levels of knowledge sharing is not explicitly supported by real life examples, as compared to Case Alpha. The use of the tangible stones and visual categorization give the participants a visual platform to engage in a dialogue to emerge at a common meaning of the object – PowerPoint – in their collaborative project. For example, when discussing *knowledge integration*, *D* pinpoints that "It has also been important in..." and *C* finishes his sentence, "knowledge integration." *D* asks, "To some degree or to a high degree," where *C* wants to clarify, "It is important over here... knowledge integration. Isn't it?" – and *D* confirms. Overall, the participants give meaning to PowerPoint as being an object that in their context functioned as an object supporting the integration of knowledge into the firm.

Transcript 2.

Case Beta: Dialogue and interaction on 'PowerPoint.' (Transcript is translated from Danish.)

C: PowerPoint?

D: Well, it was both knowledge exchange and knowledge transfer, right? It is quite important here, right?

(Places 5 stones at knowledge exchange)

C: Yeah.... Transfer, here.

(Places 3 stones at knowledge transfer)

D: It also has a degree of knowledge generation.

(Places 3 stones at knowledge generation and one more at knowledge transfer)

C: Do you want four on this one? [Knowledge transfer]

D: Yes. I think, in fact that...

C: And then we place them like this.

(Moves stones, so they are not aligned at knowledge transfer – to have space between the third and fourth stone)

D: Yes. It has also been important in...

C: Knowledge integration.

D: To some degree or to a high degree?

C: It is important over here... knowledge integration. Isn't it?

D: Yeah.

C: So I will rather have five over there *(points at knowledge integration)* than I want four here *(points at knowledge generation)*.

D: *(Places 5 stones at knowledge integration)*

Through the participants own reflection on their use of this object for knowledge sharing, they realize that knowledge was predominantly generated though face-to-face dialogue and drawings on a (physical) whiteboard. PowerPoint was used as a reporting tool, thus instead of writing a long report in Word, PowerPoint captured the most important aspects, and is an effective reference for further use.

6.3. Outcome of the dialogues and interactions

Through the conversation and interaction analysis, we have shown how the participants engage in a reflective dialogue to establish a common meaning on the object in question. The interaction with the pieces (meta-objects and stones) in the *Co-rating of objects* focuses their attention on a given object, in relation to the four abstract levels of knowledge sharing – transfer, exchange, generate, integrate. For instance in Case Alpha, the participants compared the four abstract categorizations to real life examples, and thus giving the objects meaning and contextualizing knowledge sharing. Moreover, if the participants had not completed the first part of the Object Game – the *Story-building* with several Story-cards – then the co-rating of objects would have been too abstract. The participants would have had troubles relating to these objects and their context.

The conversation and interaction analysis of the two cases highlights how the participants interpret the objects as supporting the knowledge sharing process in collaborative projects. The participants of Case Alpha engage in a dialogue with real life examples to substantiate their moves and placement of stones, which gives researchers (the authors) a better understanding of the use of for instance Excel in their contexts. On the other hand, through Transcript 2, it is not evident how Case Beta had used PowerPoint in their collaborative project, and only through a separate discussion did they explain the interaction with other objects and how those have been combined.

By analyzing the dialogue and interaction of *Co-rating of objects*, we also observed that the tangibles and visual pieces give the participants the opportunity to reflect on their (and others) behavior when for instance interacting with and through Excel and PowerPoint. The results of the ratings underscore the participant's interpretation of the five meta-objects in relation to the four abstract levels, thus *how* they interpret each object in relation to facilitating knowledge sharing. However, these ratings do not explain *why* the objects were used as they were. We only find the explanations when real life examples are given in the dialogue, or by further questioning alternative uses of objects supporting knowledge sharing.

7. Discussions

We conclude the article by discussing and reflecting on the Object Game as a research method and a boundary object. A game that both helps the researchers to collect data on different objects in knowledge sharing – and to use it as a tool to spark dialogue, interaction, and retrospective reflections between participants. Board games have qualities of formatting design dialogue (Brandt et al., 2008) and we look ahead to play with thoughts on reconstructing the Object Game to include elements in which 'as-if-worlds' of future practices could be explored (e.g., Brandt, 2006).

7.1. The Object Game as a 'sparring object'

The exploration of the 'as-is-world' of this design game (Brandt, 2006) – with *Story-building* and *Co-rating of objects* – gives the participants the vantage point from a bird's eye, which enables them to grasp a conceptual totality (Johansson et al., 2002). Together with the participants, we evaluated the Object Game. Playing the Object Game was a learning process for the participants, as they reflected on their use of different objects for knowledge sharing and learned which objects had been effective in their collaborative project, and which objects had not been effective. This collaborative retrospection through dialogue gives the participants, as well as the design game designers (authors), new insight into the use of different objects in knowledge sharing processes. Playing the Object Game has developed the abilities

of the project partners to identify which objects they can use more strategically in their future collaborative projects. Additionally, as design game designers, we did not have to facilitate the dialogue; an introduction to the game rules was sufficient, and this is an indication of a game design that is intuitive and self-directing.

It was interesting to observe how Case Alpha and Case Beta approached the Object Game. In the *Story-building*, the participants placed the story-cards by categories (colors) and thus answering the question on the category-card, for instance, starting with *Who?* and placed the most important story-card (object) in each category. In their storytelling, they pinpointed their logic in placing the story-cards as they did – horizontally in Case Alpha (*figure 5*) and vertically in Case Beta (*figure 6*).

In *Co-rating of objects*, Case Alpha chose a systematic approach by intuitively starting from the top with meta-object number one (Project Proposal), going from left (knowledge transfer) to right (knowledge integration). Case Beta, on the other hand, started from the bottom meta-object – object of own choice – and their argument was that this object was the most important for their collaboration, and they started by placing stones at knowledge generation and integration. Both approaches were equally functional.

The Object Game is in itself a boundary object, as we learned through conversation and interaction analysis of the two transcripts. A boundary object is “both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites” (Star and Griesemer, 1989; 393). The board games in the two parts of the Object Games are enacted into being a *sparring object*, according to the four S’ classification, as the object facilitates interpersonal communication, knowledge transfer and exchange between the participants, and some knowledge generation by reflecting and learning something new through their dialogue. Additionally, knowledge integration may occur as the participants integrate their learning, from interacting with each other and the game pieces, into future practices with knowledge sharing processes.

Nonetheless, as researchers and design game designers we need to accept the fact that engaging key individuals to interact and simply place tangible game pieces on a visual platform cannot convey the whole truth on the different uses of objects in collaborative projects. Through conversation and interaction analysis, we can gain an understanding of how the participants themselves make sense of their use of objects in knowledge sharing (e.g., Buur et al., 2013). In *Co-rating of objects*, each meta-object is rated in isolation, thus it does not underline the interaction with other types of objects; reality is more complex as such. When participants discussed how to rate each meta-object, the dialogue placed each meta-object in relation to other objects, similar to the *Story-building* part of the Object game. Nevertheless, this simplification does however spark a dialogue that carries a story more nuanced than when investigating the role of objects through one-on-one interviews. As such, the method of Object Game, and design games in general, functions as a hands-on tool

to bring about meaning to complex processes, such as knowledge sharing between various actors for collaborative innovation.

7.2. Playing with possible futures of collaborative practices

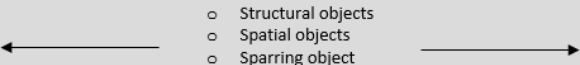
As design game designers, exploring possible futures or ‘as-if-worlds’ (Brandt, 2006) is a natural step in the development of a *Co-alignment game* with participants who want to start a collaborative project. Aligning expectations of actors from various organizational and institutional boundaries could be the outset to create a common playing field in a design game – a board game – with game pieces to design future collaborative projects.

In a cross-section of design and strategic innovation for business success, John Bessant states, “Design is essentially the application of human creativity to a purpose – to create products, services, buildings, organisations and environments which meet people’s needs. It is the systematic transformation of ideas into reality, and it is something which has been going on since the earliest days of human ingenuity” (Bruce and Bessant, 2002; 3). Designing a game that functions as a tool triggering the application of human creativity to a specific purpose is the case at heart for designing a future-oriented object game. People’s needs in that case would be the needs of the collaborative partners combined with user needs.

An interesting further development of the Object Game would be to explore the possibility of a managerial process tool to facilitate future collaborative projects between various actors by incorporating elements from the design thinking literature (e.g., Simon, 1969; Schön, 1983; Buchanan, 1992; Martin, 2009; Johansson-Sköldberg et al., 2013). Depending on the nature of the problem in the collaborative project, if the problem is human-centered and identifying user needs is essential, then these problems could be addressed through design thinking approaches (Liedtka and Ogilvie, 2011). Liedtka and Ogilvie (2011) present the design thinking process with an outset in the four questions of ‘*What is? What if? What wows? What works?*’ as the authors provide ten tools for practitioners on *how to do design thinking*.

Identifying elements for a process tool that underscores the systematic transformation of ideas of participating actors would arguably set the collaborative partners central to the game, in relation to the discovery process of wicked problems (Buchanan, 1992) or human-centered problems (Liedtka and Ogilvie, 2011), as well as in relation to objects used for knowledge sharing in future collaborative innovation projects. These four questions (in *table 1*) combined with the four-level hierarchy of knowledge sharing could assist collaborators to first explore with question of ‘what if?’ and ‘what if?’, and then move gradually from exploration to exploitation with questions of ‘what wows?’ and ‘what works?’.

Suggestions for further research include identification of possible object candidates to support the process of solutions- and collaboration-based knowledge exploration and exploitation, as illustrated in *table 1*. Those could build on the descriptive classifications of structural objects, spatial objects, sparring objects, and situational objects or Nicolini et al.'s classification of primary, secondary and tertiary objects (2012). This type of design game would set the collaborative partners central to the design of (future) knowledge sharing processes; the game itself becomes a tool for the partners to structure their collaboration and thereby gives special attention to future use of objects for knowledge sharing in order to address user needs through a systematic transformation of ideas into reality.

<i>Design thinking approach</i>	<i>What is?</i>	<i>What if?</i>	<i>What wows?</i>	<i>What works?</i>
<i>Knowledge phase</i>	Explore	Explore	Explore Exploit	Exploit
<i>Knowledge sharing (four types of knowledge flows)</i>	<ul style="list-style-type: none"> ▪ Knowledge transfer (<i>one-way knowledge flow</i>) ▪ Knowledge exchange (<i>two-way knowledge flow</i>) 	<ul style="list-style-type: none"> ▪ Knowledge exchange (<i>two-way knowledge flow</i>) 	<ul style="list-style-type: none"> ▪ Knowledge generation (<i>creation of context- and situation-specific knowledge</i>) 	<ul style="list-style-type: none"> ▪ Knowledge generation (<i>creation of context- and situation-specific knowledge</i>) ▪ Knowledge integration (<i>absorption of new knowledge</i>)
<i>Identification of possible object candidates (descriptive classification)</i>	 <ul style="list-style-type: none"> ○ Structural objects ○ Spatial objects ○ Sparring object ○ Situational objects 			

*Table 1. Envisioning the Co-alignment game:
A future-oriented design game playing with possible futures.*

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