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# Collaboration planning using visual landscape metaphors in group meetings

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**Abstract.** This poster expands the human-computer interaction perspective of visual metaphors into group meeting contexts to improve collaboration planning. We present a study in which the participants used the LEGO® Serious Play® method as part of their group planning activity. Each group chose the topic of their planning meeting. The meetings were videotaped, and then transcribed and analysed using a thematic analysis method. We used the semantic, cognitive, and material properties of metaphors for this analysis. The analysis produced various coded themes and narratives of collaboration centred around the visual metaphor of landscapes. The participants created these landscapes by stacking and connecting LEGO base pieces, using metaphorical environments in which they placed and linked different stakeholders. Landscape metaphors were alternatively used to centre activities around key persons. This study shows that the use of physical artefacts to create visual landscape metaphors provides an effective method for planning collaborations in group meetings.

*Keywords:* Collaboration planning, group meeting, landscape metaphors, visual metaphors, physical artefacts.

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## Introduction

The concept of visual metaphor has long been used as the basis for developing graphical user-interfaces and other interactive artefacts (Blackwell, 2006). In this poster, we propose expanding this concept of visual metaphors to group meeting contexts to support planning collaborations using visual metaphoric artefacts. The use of visual artefacts in group meetings has been shown to facilitate generating creative ideas (Ylipulli et al., 2017), provide a harmonious work environment (McCusker and Swan, 2018), and improve recollection of meeting content (Bolognesi and Aina, 2019).

Based on this evidence, we suspected that the use of physical artefacts, such as LEGO® pieces, would support the communication of visual metaphors to help collaboration planning in group meetings. Therefore, we conducted a study of group meetings using the LEGO Serious Play® method. The goal of this study was to better understand how the use of physical artefacts helps the creation and communication of visual metaphors in group meetings. While this study focused on the use of visual metaphors in co-located meeting contexts, our work aims to support the development of tools and methods that can be applied to remote (Kim et al., 2018) and hybrid meetings (Saatçi et al., 2020) in CSCW contexts. This would allow future collaborative digital technologies to be used together with physical artefacts to facilitate a wider range of group planning meetings with visual metaphors.

## Visual metaphors in group meetings

The concept of metaphor is about seeing one thing in terms of another thing (Lakoff and Johnson, 1980). These two things are referred to as the *target domain* and the *source domain* (Celentano and Dubois, 2014). In the context of group meetings discussed here, the source domain refers to the visual metaphors used (e.g., using LEGO pieces), and the target domain refers to their real-world counterparts (i.e., the ideas or objects to which they refer).

Jung et al. (2017) have divided the links between the source and target domains into three different types: *semantic*, *cognitive*, and *material*. The semantic link is constituted by shapes, colours, and textures representing the visual characteristics of metaphors (Heath et al., 2014). Cognitive links refer to the visual schemas of primary metaphors (Hurtienne et al., 2015). This is related to, for instance, which individual LEGO pieces are selected and how they are arranged to visually represent a metaphor (Reed et al., 2023). Finally, the material links of metaphors relate to morphologies such as graphic, tactile, and temporal uses of objects, as well as to their assigned meanings and functionality (Jung et al., 2017).

In terms of tangibility, psychologists have argued that physical artefacts can support the creation of metaphors by bridging abstract and concrete concepts (Bakker et al., 2012). Physical artefacts can also evoke memories, sensorial experiences, and ideas to help represent certain intended technical and social contexts (Jung et al., 2017). In addition, physical artefacts can reduce the likelihood of communication getting stuck during meetings (Huron et al., 2017). Although presenting physical artefacts can be reinforced by gestures (Sun et al., 2022), improvisation may sometimes be needed to apply certain artefacts to represent the desired metaphor.

## Study of visual metaphors using physical artefacts

This study was conducted to better understand the visual metaphoric themes and narratives created using physical artefacts in collaboration planning group meetings. We videorecorded a series of meetings in which the participants chose the topic of their planning activity and then followed a facilitated process that required them to build, combine, discuss, and present their individual narratives around their planning topic using physical artefacts they had made with LEGO pieces. To do this, the participants presented their visual metaphors using a storytelling method (Boje, 2008).

Table I provides a summary of our study dataset. It consists of 16 video-recorded presentations collected from 5 different group meetings, in which several participants presented their narratives. This included 24 presentations, with one participant presenting twice, once in Video 3 and another time in Video 5.

We adopted Brown and Clarke's (2021) thematic analysis method to identify, analyse, and report on the use of visual metaphors in the recorded presentations. Using this method, the identified themes are creative interpretations of the researcher analysing the data, based on their analytic skills and available resources (Brown & Clarke, 2021). Thematic analysis is, however, meant to be a flexible process (Kadir et al., 2020). As such, we included both content data through coding themes and narrative pattern data in the form of presentation fragments.

The analysis of our study data was conducted by the first author of this poster paper, who occasionally reviewed the process of analysis with the other co-authors. The analysis started by transcribing all the individual presentations from each video, which resulted in a transcript totalling 5381 words. Since some of the meetings were in Finnish, the study participants' quotes included here may be from among those that have been translated by the first author, and as such they are not meant to be considered verbatim.

Table I. A summary of the dataset used in this study.

Videos	Presenters (n)	Topic	Time (video number)
1-2	City planners (4)	What is a good strategy collaboration like?	01:45 min (1), 02:42 min (2)
3-6	University entrepreneurial education students (3)	What are central contributing factors to failure in digital disruption technologies?	03:06 min (3), 04:40 min (4), 03:40 min (5), 07:25 min (6)
7	Construction company and university representatives (3)	How can platform business, data and platform solutions improve flows of building constructions?	05:35 min
8-15	Middle managers from energy businesses (8)	How to build a joint model for the most central success factors for the company?	02:19 min (8), 01:13 min (9), 01:41 min (10), 02:10 min (11), 00:39 min (12), 01:44 min (13), 01:01 min (14), 00:56 min (15)
16	Consultants for digital services (6)	How to seal the deal with potential customers?	15:39 min (three presentations)

The iterative coding process of the transcribed data has resulted in the following main themes: *collaboration* (45 codes), *business* (39 codes), and *innovation* (25 codes). At this stage of the analysis, we have noticed that the theme of *collaboration* occurs more frequently in these planning meetings when artefacts made of LEGO pieces are used to create and communicate visual metaphors. For this reason, here we will focus the discussion of our findings only on the use of visual metaphors for planning collaborations during group meetings, and particularly the visual metaphor of landscapes.

## Planning collaborations using landscape metaphors

Our analysis shows that the study participants created various kinds of landscapes of collaboration. Differently coloured flat LEGO base pieces were used to represent the separation of geographic locations in the business contexts discussed during the planning meetings. In some cases, the base pieces were also used to represent more abstract concepts such as sustainability in corporate

communication through, for example, the use of green or blue coloured base pieces.

In addition, landscape metaphors were used to communicate development areas for ecosystems, illustrate service networks, or represent operational environments. The symbolic meanings associated with these landscape metaphors were related to the size, colour, location, and layering of the LEGO base pieces.

Figure 1 shows an example of a landscape metaphor, recreated from one of the narratives presented in the meeting recorded in Video 14. In this example, the presenter marked a smaller area, using light grey coloured LEGO base pieces (see top right in Figure 1, next to the pink flag) to indicate their local actors. The darker grey coloured base piece underneath represented their global business environment and its related stakeholders (see the LEGO humans in Figure 1). The presenter gave the following narrative in this case:

*"We acknowledge the support from the different continents. And then the information flows, as here are these local experts who have received help from there and improved. Then, here is this kind of a hero who observes this group so that they also work accordingly and works as a link with these international persons."*

The presenter subsequently moved on to discuss the broadest and more abstract landscape created with the blue coloured base pieces. This area metaphorically represented sustainability and their future business plans to become "a bit more colourful and international", as noted in the narrative:

*"When we get help from here, we get colourfulness so we will be separated from that grey mass where the other builders are in. We are a bit more colourful and international."*

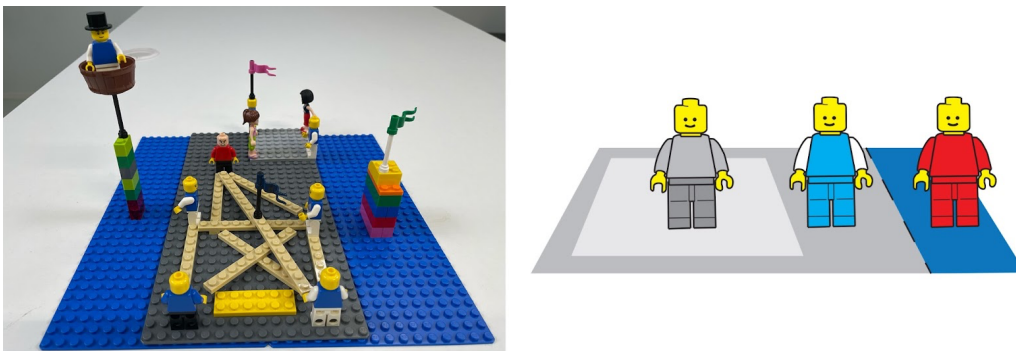


Figure 1. The example shown on the left uses the landscape metaphor to represent various geographic and abstract business environments, which are separated by stacking differently coloured and sized base pieces on top of each other. Human figures show different stakeholders in each environment.

Figure 2 shows another example of a landscape metaphor recreated from the one presented in the meeting recorded in Video 16. The landscape shown in this example presents a centre-peripheral arrangement around a single central

figurehead person – or gatekeeper – needed for a business project to take place. Using this landscape, the presenter created a peripheral metaphor around a central customer in relation to their surrounding base pieces and other material. The presenter described their narrative from the perspective of this central person, who had a problem to solve, saying:

*"So, we need to find this person, because otherwise, it is sort of, this project does not proceed. We need to see this from that person's perspective, this artificial intelligence and the situation otherwise."*

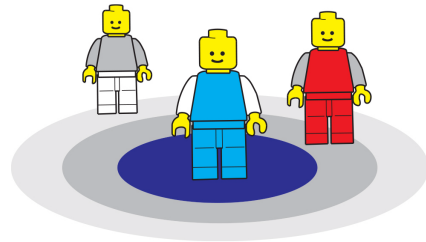


Figure 2: In the example shown on the left, a centre-peripheral landscape metaphor represents the character with a red flag on its head (near the grey shark's head) having a central role.

## Discussion and conclusions

The study presented here has focused on the thematic content and narrative patterns of landscape visual metaphors used in collaboration planning group meetings. By adopting the framework proposed by Jung et al. (2017), we have used the *semantic*, *cognitive*, and *material* characteristics of visual metaphors to analyse the collaborative landscape metaphors used in our study meetings.

The *semantic* characteristics relate to seeing different areas made from base LEGO pieces. These pieces are either stacked or joined together to show different business environments, either geographically or in a more abstract sense. The landscape metaphors are sometimes centred around key characters or stakeholders, and the business world is perceived from their perspective.

The *cognitive* characteristic is identifiable in visual schemas of diversion, stacking, centre-periphery, near-far, and big-small schemas connected to LEGO pieces. The *material* characteristics, on the other hand, relate to building base pieces and assigning meanings to them. For example, local or global business collaborations – or more abstract concepts such as future sustainable development

– are represented through the material characteristics of the LEGO pieces, including, for instance, their colour or size.

These findings show that the use of physical artefacts (e.g., LEGO pieces) can facilitate creation and communication of visual metaphors such as landscapes to support collaboration planning in group meetings. While in this poster paper we have only focused on one group of visual metaphors, our analysis is providing promising results in terms of a wide range of other types of visual metaphors. We are planning to continue with our analysis to develop a more comprehensive understanding of the use of visual metaphors in group meetings.

In addition, we are currently planning future studies which will aim to investigate the use of other types of physical artefacts in group meetings to better facilitate the communication of visual metaphors. In these studies, we will also use eye-tracking tools to analyse and understand group meeting dynamics and interactions around physical artefacts used for communicating visual metaphors.

Finally, although our studies have so far been based on co-located group meetings, the ultimate objective of our work is to guide the design of future CSCW environments that facilitate metaphoric communication and interaction around shared workspace across distance using physical artefacts.

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