

## Recognizing non-designers' contribution in the process of designing information on visual management boards: a metaphorical approach

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### Abstract

This paper presents a sub-study on participatory design in visual management (VM), bracketed from a larger case study. In this case, VM refers to the recurrent meetings when managers and co-workers use dashboards (VM boards) to continuously organize work activities and performances and contribute to the ongoing development and improvements within the organization. The study focuses on when the managers and co-workers are participating in the process of designing and visualizing work-related information regarding workload for future VM boards. This paper emphasizes collaborative workshops and the creation of moodboards as participatory methods, and the application of theories of metaphorical thinking and conceptual and visual metaphors. The findings show that participants perceive the visual output they create metaphorically, in this case, the moodboards. Such visual outputs represent conceptual and visual metaphors that evoke the participants' sharing of core concepts and an establishment of stories related to the information to be designed. In turn, the metaphors and the storytelling stress desires, visions, objectives, and themes, besides workplace atmospheres, norms, and values governing the workplace. This understanding translates to shared work experiences where conceptual and visual thinking impact how work teams develop work-related information on VM boards together.

**Keywords:** Visual management, Mood boards, Participatory design methods, Information design, Metaphors

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### 1. Introduction

Visual management (VM) can be explained as a visual information or communication strategy within an organization (Tezel & Aziz 2017; Pedo *et al.* 2022) and is an established concept in Lean manufacturing and production and the related literature (Tezel, Koskela & Tzortzopoulos 2009, 2016). Then, VM as a concept relates to the car industry in the 1940s and the Toyota Production System (Koskela, Tezel & Tzortzopoulos 2018). However, the ideas of VM can be traced back to Taylorism and scientific management at the end of the nineteenth century, as described by Yates (1993), and stretched even further back in time (cf: Tezel *et al.*

2009). Today, VM, as an evolved concept, can be found in several professions and knowledge areas such as construction, maintenance, and health care (e.g., O'Brien, Bassham & Lewis 2014; Tezel & Aziz 2017).

The concepts of visuals and visual information are essential in VM. In this context, they refer to work-related information that is visualized, for instance, drawings, charts, graphical forms, color codes, typefaces (Meyer *et al.* 2013), graphs, diagrams, and tables, among others (Davison, McLean & Warren 2012).<sup>1</sup> Such visual information is presented by a device or system. The VM board is an example of such a device, a dashboard, usually presented as a whiteboard or a digital interface. The VM boards have varying labels and are referred to as, for instance, Lean boards, team boards, or visual planning boards (Söderlund & Hansson 2021). Managers and co-workers gather around the VM boards on reoccurring daily, weekly, or monthly meetings. With the support of VM boards and the associated meetings, they create, plan, and follow up on work activities and performances (Zarbo *et al.* 2015) and participate in the ongoing development work and continuous improvements within an organization, including its departments and teams (Jaca *et al.* 2014).

In this context of VM and VM boards, as demonstrated by Singh & Kumar (2021), there are high expectations of what visuals and visual information may contribute. In VM literature, a visual approach is expected to support effective communication in organizations (Bititci, Cocca & Ates 2015; Galsworth 2017; Murata 2021). The aid of visuals should, for instance, provide an accessible, apparent, and overall picture of systems, processes, problems, and performances (e.g., Detty & Yingling 2000; Womack & Jones 2003; Parry & Turner 2006; Singh & Singh 2015). Visual information in this context is believed to be understood by all (Galsworth 2017), bringing a similar and mutual vision of problems/situations (Greif 1991) and leading to increased transparency (Singh & Kumar 2021). Such a visual approach supports the empowerment and morale among the personnel (Eaidgah *et al.* 2016) and encourages their engagement with what is going on in the organization (Liff & Posey 2004; Bititci *et al.* 2015).

This visual approach in the VM literature implies inclusion and a democratic purpose. It refers to work-related information that is visual being considered accessible and comprehensible and supports the personnel in understanding and being involved in various activities and events in the organization. However, inclusive and democratic purposes may also be imprinted in the process of designing visual information and its outcome. It is reflected by the collaborative design approach when different participants design together (e.g., Sanders & Stappers 2008). It is even more clearly reflected by the participatory design approach, which has a historical connection to the democratization of workplaces, change and development work, and the inclusion of workers and the user perspective in the design process (Gregory 2003; Bjögvínsson, Ehn & Hillgren 2010, 2012). Nonetheless, design studies and research in the field of VM are rare (Beynon-Davies & Lederman 2017; Fenza, Loia & Nota 2021; Söderlund & Hansson 2021).

This paper will emphasize participatory design in VM around the design of visual information on VM boards. The aim is to describe managers' and

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<sup>1</sup>Besides visual information, VM also deals with information stimulating other senses than vision, for instance, audial information (Beynon-Davies & Lederman 2017), which is not covered in this paper.

co-workers' design contributions as non-designers, generated in the participatory process of designing and visualizing work-related information for future VM boards. This paper contributes theoretical and analytical knowledge on the recognition of the participants' visual output created during the design process, as part of the future VM board development. The underlying elements for presenting such an approach are an introduction to participatory design in VM. It leads to a framing of the research questions. From there, theories for analysis are outlined, emphasizing metaphorical thinking and conceptual and visual metaphors, and the research delimitations are discussed. The research design is presented at this time, followed by an analysis of findings based on the outlined theories. Finally, the findings are discussed, the conclusions are drawn, and proposals are put forward for future research.

## 2. A reflection on participatory design and VM

Design is always part of a historical process (Dilnot 2015). How we approach design as a concept has changed with time and societal movements (Margolin 1995/1992). From the end of the 1970s to the 1990s, when computers became available in workplaces and homes, new scholarships and concepts were developed, such as human-computer interaction (Ritter, Baxter & Churchill 2014). These societal movements, among others, formed the basis for new design approaches and standards, such as user-centered and human-centered design.

Participatory design as a central tenet is generally accepted as a part of the human (user)-centered design approach. However, participatory design as a Scandinavian tradition was already recognized in the 1970s. It was founded on the idea that those affected by, for instance, a product or system should have something to say about its design (Ehn 1992). The participatory design approach can be found in several knowledge areas and practices (cf. Dantec & DiSalvo 2013). Historically, participatory design as a tenet has had a clear relationship to VM, as it initially addressed the development of changes in workplaces, in production, and how we organize work from the blue-collar worker perspective (Bjögvinsson *et al.* 2012). In that sense, the participatory design approach reflects a democratization aspect of the workplace, with workers active in the design process and design decisions (Clement & Van den Besselaar 1993; Muller & Kuhn 1993; Gregory 2003). The democratic aspect can be compared with Buchanan's ideas regarding the human-centered design approach that should reflect humanistic values such as "human rights" (Buchanan 2001, p. 37).

It is common to address participatory design as a collaborative approach, focusing on the user as a non-designer who is included in developing, for example, systems, environments, and artifacts. However, participatory design today may also have an expanded meaning and comprise methods and practices to involve a diversity of stakeholders active in the design learning process (DiSalvo *et al.* 2017). The designer's classical role as an observer or investigator of the user context and the users' needs differs from the intent of the participatory design approach. In participatory design, the core is to create together, and the dialog among participants aims to achieve a collaborative, inclusive, and democratic design process (Salvo 2001). It is possible that participants adopt a designer role, likely facilitated by a professional. However, the participant's role is to contribute to the design process with their perspectives of professional knowledge, experiences, and

practice. It reflects a learning process between participants involved, which is vital in participatory design, according to Bjögvinsson *et al.* (2010)).

Also, an empathic attitude is essential in participatory design. Empathy has no unified definition in this context: it may be a method, a way of thinking, or a behavior (Chang-Arana *et al.* 2020). An empathic approach to design can be explained as a way for the designer to respond to others' emotions and to achieve an understanding of others' opinions and perspectives (Kouprie & Sleeswijk Visser 2009), and "...using this understanding to make future design decisions." (Chang-Arana *et al.* 2020, p. 2). In participatory design, an empathic approach does not only concern the designer–user relation. When designing together, it also involves the participants in the design process and their awareness of the other participants' experiences, perspectives, and feelings. Putting oneself into another participant's "shoes" may be considered an act of empathy, which enables communication in such a design process (Ho & Lee 2012), including human encounters that may contribute to design relations (Söderlund & Evans 2022).

As acknowledged by Sanders, Brandt & Binder (2010), there are a large number of participatory design methods/techniques to involve participants and enable them to contribute to the design process. One type of method/technique is when participants create visual outputs, such as mock-ups and collages during different phases of the design process. Such an output plays a central role in participatory design since it is "...supporting communication or participation..." (Bjögvinsson *et al.* 2012, p. 106) among participants and may facilitate their inclusion and involvement in the design process.

The VM literature, as outlined in this paper, emphasizes two methods when participants generate such visual outputs – the Canvas method (a business management method developed by academics) and the A3 method (originated in Toyota Production Systems). Work teams use the methods to, for example, visualize problems and support communication (Chakravorty 2009), decision-making, and sharing of ideas (Tjell & Bosch-Sijtsema 2015), to solve problems, learn from each other's, and develop design solutions (Koskela *et al.* 2020). However, the theoretical foundation of these participatory design methods is not well-substantiated, particularly not the Canvas method, according to Koskela *et al.* (2020). In addition, the author has noticed the methods have a tenuous theoretical connection to visual studies and design research, even though the methods deal with the visual outputs created in a participatory design process.

## 2.1. Framing the research question

As discussed in previous sections, visual and work-related information is considered crucial in VM. Such information has inclusive and democratic purposes by supporting personnel in understanding and being involved in various organizational activities, ongoing development work, and continuous improvements. Despite the conviction of the positive effects of visual information, there is a significant need for visual studies in this context (Bell & Davison 2013; Davison, McLean & Warren 2015; Beynon-Davies & Lederman 2017; Beynon-Davies 2018; Eriksson & Fundin 2018).

For work-related information to become visual, to begin with, the information needs to be designed and displayed in a VM device/system, such as a VM board. However, the VM literature lacks design research and studies (Beynon-Davies &

Lederman 2017; Fenza *et al.* 2021; Söderlund & Hansson 2021). There are a few exceptions, see, for example, Brady *et al.* (2018) and Murata (2021). These studies have a normative purpose. A designer or engineer is investigating the user context and approaches the design process as a problem-solving process. It results in design support such as guidelines or new or modified design, for example, a redesigned VM board. However, these studies pay little attention to the chosen design approach, its impact on how the VM device/system is developed, or the involvement of participants. In the study by Kurdve *et al.* (2019), a problem-solving method is applied that includes participants in the redesign of VM board information. However, the participants' visual outputs (e.g., sketches/collages) generated during the process are not explored even if such contributions are steps toward a design idea/solution.

In VM, a participatory design approach is relevant to consider due to its historical context in work organization, its democratic attitude, and its learning- and empathetic approach to the design process and in design decisions. Nevertheless, in-depth studies on participatory design are rare in the outlined VM literature and in studies regarding VM board design. As previously stated, the aim is to describe managers' and co-workers' design contributions as non-designers, generated in the participatory process of designing and visualizing work-related information for future VM boards. The questions this research sets out to answer are a) how do managers and co-workers perceive the visual output (e.g., sketches/collages) they generate when involved in the process of designing visual information on VM boards and b) what are the characteristics of the visual output, from the participants' point of view?

### 3. Theory for analysis: metaphors and metaphorical thinking

Theories and notions concerning participatory design in VM have already been discussed in the paper, and the need for visual studies and design research in the VM literature was noted previously. In this section, a theory for analysis is outlined providing central terms and concepts to study how participants may relate to the visual outputs they generate in the participatory design process. There are several possible theoretical approaches in the context of VM, for instance, a semiotic approach (Beynon-Davies 2018) or a rhetorical approach (Bell & Davison 2013). This paper introduces a theory for analysis based on previous research that concludes that metaphors play a role in managers' and co-workers' understanding and use of work-related information on VM boards (see Söderlund & Hansson 2021). The starting point of this paper is that the role of the metaphor is also relevant to consider when designing VM board information. The literature is extensive on the subject, which is why this section is limited to a few theories from prominent academics and mainly focuses on the cognitive aspects of metaphors and conceptual and visual metaphors.

Metaphors can be seen as poetic expressions. However, there are different, even divergent, approaches to the metaphor as a phenomenon (Refaie 2003), where the linguistic and cognitive approaches are common. Jakobson (1971/1956) underlined the contextual relations of the metonymy (based on contiguity) and the metaphors (based on similarity) in linguistics. However, Lakoff & Johnson (1980; see also Lakoff 2014) suggested a cognitive approach and deliberated on the

conceptual metaphor, referring to how metaphors structure our perception, thinking, and doing. How we experience metaphors affects our capability to express our ideas. For instance, explaining a disease as attacking the body refers to a war metaphor demonstrating a structural relationship between the disease and war. In addition, metaphors refer to our orientation in space (orientational metaphors). On such occasions, happy is “being up,” and sad is “being down.” Besides, the physical metaphor refers to the relation of our corporal bodies and space, such as a close physical relationship that relates to intimacy.<sup>2</sup> Nevertheless, according to Gibbs (2002), there are no clear definitions or classifications of what constitutes a metaphor. There is no consensus regarding how metaphors are expressed or how they can connect with our thoughts.

Lakoff (2014) refers to his preliminary work and states that conceptual metaphors are first and foremost conceptual, but they can be visual as an alternative. When a metaphor has the visual expression of an image it may “visually embody” a conceptual metaphor (Kövecses 2010, p. 64). In this case, the concept of image is relevant and what constitutes an image is greatly debated. A possible explanation is given by Arnheim (1969) that an image functions as a picture, sign, and symbol. Thus, an image depicts the world; it represents something and can be highly abstracted. The semiotician Nordström (1996) attempts to explain the association between images and metaphors, a metaphor is “created” when we combine two different phenomena or worlds of experience or replace one with another. Metaphors are a matter of transferring “image to image” and mental images to produced images (Ibid, p. 35).

The (visual) metaphor can be explained as the sum of the combination of diverse phenomena moved into a shared context. For instance, a VM board’s information structure can be defined as a visual metaphor symbolizing the concept meeting agenda, which organizes the associated meetings with managers and co-workers. A VM board and its content can also be metaphorically compared with post-its and memory notes referring to work plans and schedules. Additionally, a VM board may consist of green, yellow, and red color codes, a traffic light metaphor. It symbolizes states, results, and conditions, aimed at managers and co-workers to reflect on or react to, for instance, carry out or refrain from a work action. For example, tables on a VM board with planned work activities may metaphorically represent a lack of work or an extensive workload among the staff (Söderlund & Hansson 2021).

To summarize, when someone orally or visually expresses a metaphor, it refers to metaphorical thinking. A conceptual metaphor is based on a process linked to our experiences and knowledge of the world when interpreting certain phenomena or situations (Kövecses 2010). Interpreting and expressing metaphors involves a shared understanding of the world we are acting within. This understanding translates to shared knowledge and experiences where metaphorical thinking and conceptual and visual metaphors impact how we comprehend, use, and respond to work-related information on VM boards. The comprehension, use, and response also relate to the design of such information. This two-way relationship between metaphorical thinking and the design of work-related information on VM boards is relevant to consider.

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<sup>2</sup>Structural, orientational, and physical metaphors are three types of categorizations suggested by Lakoff & Johnson (1980); however, there are other possible categorizations.

### 3.1. Delimitations: VM board information regarding workload

A VM board in the context of this paper consists of various information that is work related. For instance, information may be manually written and appear as printed documents that include planned and met objectives (Kurdve *et al.* 2019). Bar charts and trend graphs are used to visualize an organization's quality, safety, and delivery issues among others. In addition, photos of staff members and a listing of work priorities may be visualized on a VM board for work teams to plan and schedule work (e.g., Söderlund & Hansson 2021). This paper focuses on VM board information regarding the organization's wellness, in particular teams' workload. In this case, wellness refers to the personnel's well-being and the culture that supports well-being, which corresponds to the definition by Diamante, Natale & London (2006). Such themes are explored in work-life science, organization(al) studies, and similar disciplines. Nevertheless, this paper does not include literature related to these fields. This paper is limited to VM as a knowledge field as outlined in the paper, and the VM boards used to support the organization of work activities and performances, including ongoing development and continuous improvements in an organization. Additionally, this paper stresses participatory design as a field of knowledge and focuses on metaphorical thinking and the design and visualization of VM board information. There are no predetermined symbols/graphics or other visuals to present aspects of wellness/well-being on a VM board. In practice, the colors green, yellow, and red are applied to visualize all sorts of states, conditions, and results. This color code can also be combined with emoticons, representing happy and sad faces, see, for example, the study by Beynon-Davies (2018). The color coding will be considered in this paper and the study presented herein.

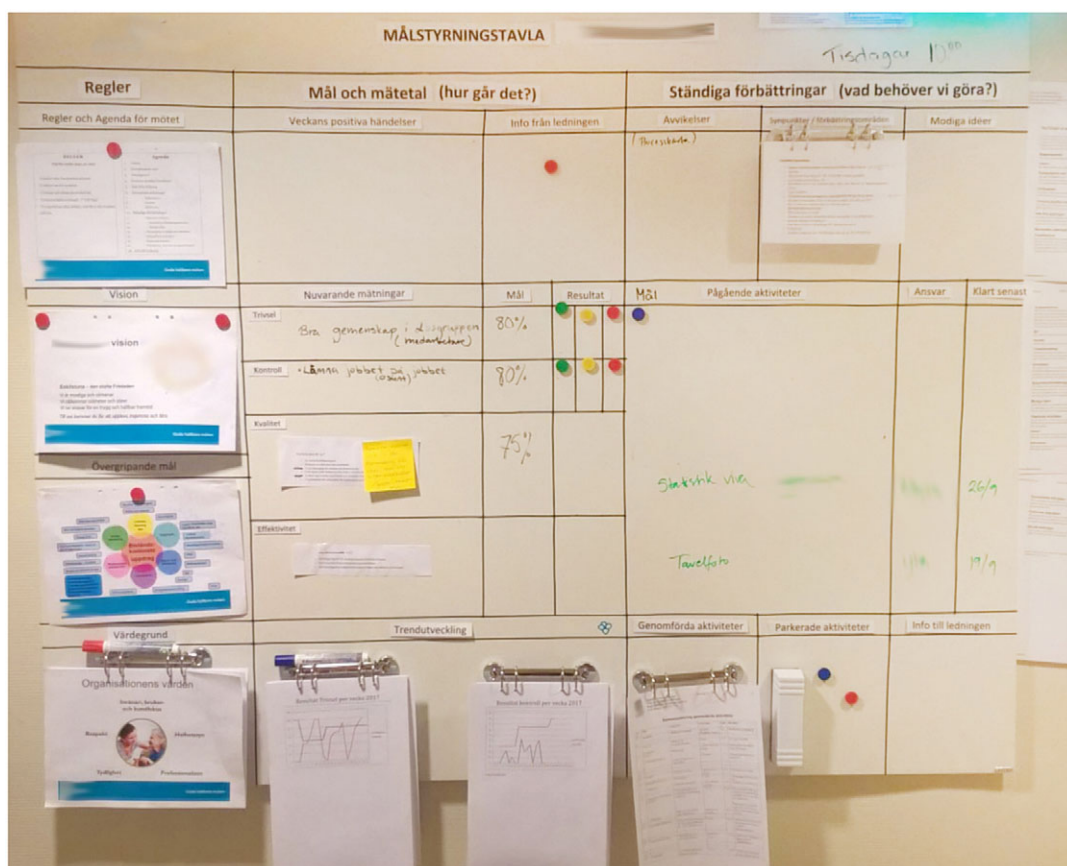
## 4. Research design

The paper presents a sub-study bracketed from a more extensive case study regarding VM boards, carried out from 2017 to 2019. Two large (>250 employees) and two medium-sized (>50 employees) manufacturing companies and a medium-sized municipal office participated in the larger case study. This paper is limited to the municipal office as a single case. It will function as a basis to theorize how managers and co-workers perceive the visual outputs they generate when involved in designing and visualizing VM board information, and the characteristics of such visual output, in accordance with Stake's notions on case study research (Stake 1995).

The municipal office in this study is characterized by a high degree of education and specialization among the employees, mainly sociologists, and behavioral scientists. It is a female-dominated workplace: nearly 90% of the co-workers and over 70% of the managers are women. They are restricted to the laws, standards, and routines that come with public authority. The work tasks reflect a high degree of formalization and goal complexity in terms of the type and number of decisions made during the day. The implementation of VM boards started in 2016 in seven departments and work teams. Each team gathers around a VM board on recurrent meetings weekly/biweekly to create, plan, and follow up on work activities and performances and participate in the ongoing development work and continuous

improvements of the department and its teams. In this case, various work-related information is presented on their VM boards (Figure 1).

Prior to the study being conducted, the participants used green, yellow, and red magnetic tokens, with additional handwritten text, to visualize information regarding well-being on their VM boards (Figure 1). The design of the VM boards and their content has not been guided by consultants or overall organization standards. The general strategy at the municipal office is that VM boards should be developed by those who use them. In this study, the users are represented by managers and board coaches, non-designers with no documented experience of (participatory) design methods. The board coaches are regular employees without management positions that develop the boards with the teams. The board coaches in the study conveyed the teams' views and opinions on the particular situation. These



**Figure 1.** The VM board in the picture is located at the municipal office participating in the study. To the left, the board presents documents with the meeting agenda, guidelines, and the organization's vision. It is visualized using a circular diagram with explanatory text boxes. In the center are the goals of the team/department, presented with handwritten text and post-its. Below are magnetic tokens in green, yellow, and red, and handwritten text concerning the personnel's well-being at work. To the right are areas related to continuous improvement and suggestions for development. Below are documents and handwritten notes visualizing the ongoing, completed, and pending activities, including the names of the persons responsible.



prerequisites represent the analytical typicality of the case, as described by Hansson (2011).

Multiple participatory methods precede the study to gain an understanding of the premises and conditions regarding the VM boards in this case. The spatial conditions and the information flow between VM boards and the associated meetings have been investigated, in addition, the participants have been involved in exploring problems and information needs, and contextual prerequisites regarding the VM boards in separate workshops. This is further reported in Söderlund *et al.* (2020a,b). In addition, there have been information meetings, pre-meetings, and debrief meetings, to recognize the work context and organizational structures and prepare for the study. This paper is limited to three collaborative workshops with the managers and co-workers that participated in the study, followed by additional meetings and interviews. The workshops were arranged/facilitated by the author of the paper who is also a trained designer. The collaborative workshops aimed to involve the participants in the process of designing a new type of information visualization regarding workload. This paper focuses on the visual output (in this case moodboards) generated by the participants during one of the workshops. The workshops and the overall process are further described in [Table 1](#) and [Section 4.2](#).

## 4.1. Moodboards as a participatory design method

Each participatory method is unique for each project and depends on contextual issues, time limits, and purpose, among other factors (Sanders *et al.* 2010). In the study, collaborative workshops and moodboards have been performed to involve managers and co-workers in the process of designing information regarding workload, to be added to their future VM boards.

Moodboards are based on a collage technique, which is suggested as a potential participatory design method by Sanders, Brandt, and Binder (Ibid.) and when developing VM devices and systems, such as VM boards (Felippe, Rech & Silveira 2021). Participatory design can be considered an inefficient process, and Berthet *et al.* (2020) argue that moodboards are one of the less time-consuming methods in this context. Besides, creating moodboards does not require special tools or pre-training, sketching, or technical skills, which was a prerequisite for the participants in the study.

The participants in the study created seven moodboards, which represent their visual output generated during the design process ([Figure 2](#)). In this study, a moodboard is considered a visual image. It gives a “fuzzy” description of what is to be included in the design and frames the design possibilities (Eckert, Stacey & Earl 2013, p. 97), and guides the design ideas and solutions as exemplified by Endrissat, Islam & Noppeney (2016). There are additional explanations for the aims of moodboards. In this case, the participants created moodboards to jointly reflect on the form, color, shapes, and style of VM board information to be designed, which corresponds to one of the aims suggested by McDonagh & Storer (2004) where moodboards commonly refer to a designer–user situation. However, the creation of moodboards has additional purposes in participatory design. When the participants generate such visual output during the design process, it supports their participation and communication, as described by Bjögvinsson *et al.* (2012).

**Table 1.** A description of workshops and the overall process

Methods	Participants	Procedure
2 collaborative workshops	1 manager, 3 VM-board coaches; and 1 developing manager, 6–8 VM board coaches	Approximately 1-hour-long workshops, organized on heuristic analysis, brainstorming and group discussions. In the first workshop, the participants inventoried their information needs. Afterward, they agreed to visualize a new type of VM board information regarding the workload of the teams. In the second workshop, the participants deliberated on what constitutes such information, and the different aspects of the subject matter were sorted out. (These findings are not reported in the paper.)
1 workshop session including 1 group interview and additional discussions (audio-recorded)	1 manager, 6 VM-board coaches	Approximately 1-hour-long workshop, facilitated by the author. Workshop tools: scissors, A4 paper, glue, and various printed magazines and publications. At the beginning of the workshop, the participants were instructed to select visual elements from the magazines and publications (e.g., colors, shapes, fonts, text, and photos) that they prefer when visualizing information regarding workload on their future VM boards. Seven (7) moodboards were created, each on A4 papers, including one that was created across two A4 papers (Figure 2). Subsequently, the participants were instructed to describe and explain their moodboard design to the other co-workers for approximately 30 minutes
1 associated meeting	The manager and the board coaches	Based on the preceding methods, the author developed two prototypes. The participants reviewed the prototypes (their visual design and function) and selected one. Afterward, the board coaches arranged meetings to evaluate the prototype with respective teams, with over 30 workers in 5 teams, the board coaches included. (These resolved prototypes and evaluations are not included in this paper as they do not concern the visual outputs generated by the participants, which is the scope of this paper.)

**Table 1.** Continued

Methods	Participants	Procedure
1 group interview (audio-recorded)	1 development manager, 1 VM-board coach	A 40-minute group interview was carried out by the author when the study ended, based on open-ended questions. The intention was to capture the participants' experiences of participating in the design process and the creation of moodboards. In this section, one of the participants was involved in creating moodboards, the other participated in the additional methods of the study See immediately above – a 45-minute group interview involving five participants who created moodboards. The other participants were involved in the additional methods of the study
1 group interview (audio-recorded)	1 manager, 7 VM-board coaches	

#### 4.2. A method for analyzing moodboards in participatory design

Analyzing moodboards requires interpretation skills (Eckert *et al.* 2013); thus, theories and methods are needed to analyze the moodboards created by the participants in the study. Nevertheless, in the search engines *Google Scholar* and *Primo* (and the keywords “moodboard(s),” “mood board(s),” “participatory design,” with and without the words “visual management”), there is currently a scarcity of scientifically reviewed and published literature regarding in-depth analyses of moodboards created in a participatory design process, and the elements of which they consist. Therefore, a method for analyzing has been developed as a part of the study.

In this study, the participants' moodboards are approached as visual images, based on printed text and pictures, which are referred to as visual elements that form a coherent whole. The analysis is influenced by the image interpretation methods of iconography and semiotics (see also Eriksson & Göthlund 2012). Additionally, the analysis also relates to Roland Barthes's notions in “Rhetoric of Images” (Barthes 1985/1964) regarding denotative and connotative aspects of images.

To begin, each participant in the study created a moodboard and then described and explained the moodboard design to the other co-workers. At this point, the author of this paper described the moodboards' visual elements and their different partial meanings. It was then compared with the participants' oral explanations of the same. To interpret the moodboards, theories related to metaphorical thinking and conceptual and visual metaphors were applied by the author as previously outlined in this paper. Details regarding the process, various parts, and steps are listed below:



**Figure 2.** Moodboards - thumbnails and details. The upper images (a) are thumbnails representing seven moodboards created by the participants in this study. The lower images (b) highlight visual elements of some of the moodboards. The moodboards in this figure are not an exact copy of the participants' moodboards, they are redrawn by the author as the original design may be based on copyrighted material.

- *First*, the moodboards' visual elements were identified and classified to capture the denotative aspects of the moodboards, that is, their literal/obvious meaning. These visual elements represent different text styles (uppercase and lowercase letters, font, and typeface), shapes (circles, rectangles), patterns (dots, stripes), photographs with different motifs, cut-out text, and handwritten text by the participants. Their frequency was counted to determine whether some of the elements are more prevalent than others. Next, keywords were created for the visual elements that dominated in number.
- *Second*, the audio recordings, with the participants' oral descriptions and explanations of the moodboards, were summarized. The dominant visual elements were compared with the participants' statements. Based on the findings, five categories were outlined: "vegetation and elements of nature," "household items and other familiar artifacts," "people," "color scheme," and "text, pictures, and disposition." Keywords and quotations from the participants were selected, reflecting these categories.
- *Third*, when interpreting the moodboards, the visual elements, and their connotations, the five categories above were analyzed through theories regarding metaphorical thinking, emphasizing conceptual and visual metaphors. Associations were highlighted regarding the prevailing work context of the participants.

## 5. Result and analysis

The previous section described the aim of moodboards as a participatory method and the specific moodboards created by the participants in this study when involved in the process of designing and visualizing VM board information. In addition, a method for analyzing moodboards has been introduced, and theories emphasizing metaphorical thinking and conceptual and visual metaphors have been outlined to serve as an analytical framework (section 1.2). Here that framework is applied to analyze and interpret the visual output generated by the participants (i.e., the moodboards), including their oral explanations of the moodboard designs. In this section, each participant is coded with a number, for example, Participant no 1. The coding is linked to interview quotes and the participants' unique moodboards. Additionally, the analysis is delimited to the dominating visual elements in the moodboards. Moodboards and their elements are presented by the number of times they appear, for example, five out of seven times. At the end of the analysis, interviews are summarized regarding the participants' experiences of the participatory design process.

### 5.1. Analysis of moodboards and their visual elements

The participants created 7 moodboards. They are based on visual elements from printed magazines and publications and consist mainly of naturalistic pictures representing vegetation and elements of nature, household items and familiar artifacts, people in different situations, and various color schemes. Each category is analyzed individually as follows.

#### 5.1.1. *Vegetation and element of nature*

Pictures of vegetation and elements of nature (naturalistic or abstract) are dominant and occur in 6/7 moodboards and appear in at least 19 pictures (depending on the level of detail) and one (1) text: "plants." The pictures depict trees, grass, flowers, bushes, petals, berries, and leaves. According to the participants, such visual elements refer to concepts such as tranquillity, relaxation, recovery, caring, joy, and love, which relate to various well-being factors. Additionally, one of the participants (no 2) uses flowers as a metaphor to highlight the importance of the teams' motivation and joy. Such visuals, combined with colors, also refer to relationships between workers and their work achievements, expressed by one of the participants (no 1): "*Here I think of the different color scale based on the fact that we who work are different. But we can belong together anyways...[and] have great precision there like the flowers.*" In addition, single or combined pictures with vegetation and other elements of nature may also serve as visual metaphors for feeling stability at work or a stable foundation. For example, Participant no 4 explains such a structural relationship with a picture of a flower garden and the concept of work stability: "*... Enjoy nature, maybe do some work in the garden... that you have a stable foundation.*" The garden metaphor is, in this case, enhanced with another image of a lighthouse in natural stone and the handwritten text: "stable ground," which reinforces the symbolism.

## 5.1.2. Household items and other familiar artifacts

The moodboards depict household items and other familiar artifacts in at least 14 singular pictures (depending on the level of detail), for instance, sunbeds/loungers, a sofa, cups, saucers, game consoles, a bicycle, pots, and bottles. Such pictures may relate to concepts of leisure activities indoors or outdoors. When the participants explain the pictures, concepts related to work innovation, development, and collaboration are also emphasized. One of the participants (no 6) describes a picture of a staircase as a visual metaphor for gentle, long-lasting, collaborative work and motivational steps. In addition, an apple in a bowl is explained as a structural metaphor for: "...*thinking outside the box*," and a bike symbolizes progression, moving forward (in time and space), according to Participant no 1. A picture of a box with eye shadows functions as a structural metaphor for single work activities as interrelated parts of a larger whole (a team/organization), as explained by Participant no 2. On the same moodboard, a photo of hand controls for a PlayStation console acts as a structural metaphor for team spirit. Thus, such a console relates to gaming as an individual and social activity.

## 5.1.3. People

In all the moodboards and 10 pictures, people are depicted of different ages (children, middle-aged, and seniors), individually and in groups, with upper- or full-body positions, and on one occasion with the lower body. The portrayed people play, run, and express feelings (e.g., happiness, satisfaction, or affection). Five out of ten pictures depict people working out in groups, running (on the beach), and jogging, and 3 pictures where people are "hanging out" together. While the situations occur in an everyday context, the motifs become visual metaphors, in which the participants refer to the work context. The pictures can be explained as conceptual metaphors related to the excellent condition and health of the individual worker/team/department. Furthermore, children playing and smiling adults close to each other serve as physical and orientational metaphors for good team spirit and well-being. A picture of a famous football player (Zlatan Ibrahimović) is explained as a structural metaphor associated with work achievements and a work team's capacity to keep on developing work: "...*he succeeded in something he thought was impossible...that we can move forward*" (Participant no 1). However, such pictures may also represent two opposite conditions – good health and negative stress, as expressed by Participant no 3: "...*we should try to think that everything takes time, we do not always have to run, we should simplify, making it simple*." Nevertheless, the photographs of people are not solitary visual elements; there is an interplay of other pictures, colors, and shapes. The interplay can be metaphorically used to reinforce emotions (e.g., fun) and needs (e.g., sustainable organizational development) and identify behavior (e.g., helping each other), as expressed by Participant no 7: "...*team spirit, it gets more fun that way, it becomes sustainable...you help each other. /... / I like the colors and the shapes, a bit soft*."

## 5.1.4. Color scheme

The moodboard's predominant colors are nuances of green, yellow, red, and blue visible in color samples, pictures with household items and other familiar artifacts (e.g., cups/sunbeds), and vegetation (flowers, berries, leaves, and the like). The

colors are partly related to the conventional color coding in VM where green represents a good condition/result or okay/go, yellow symbolizes uncertainty/interruption, and red represents a stop/warning or undesirable conditions or results. The participants use these colors (and blue color) to create a structural relationship with aspects of well-being at work and the work atmosphere. However, when the participants' described the colors they also had an expanded symbolism. Green may also represent a desired and future experience, as articulated by Participant no 3: "...green symbolizes calm...to find calm...that you try to find this green..." Likewise, red berries become a concept for a positive state and promising future: "We can get something sweet from it, positive, that it becomes a bit red and tasty." (Participant no 1). In addition, yellow is a visual metaphor for a positive atmosphere and psychosocial conditions related to a workplace: "Orange and yellow are warm colors, it is a warm atmosphere, a feeling of good mood" (Participant no 7).

### **5.1.5. Text, pictures, and disposition**

The moodboards represent a coherent disposition of visual elements; thus, six out of seven participants described the elements by starting from the top of the moodboard to the bottom and from left to right. One of these participants began with the visual element in the page's middle and then continued from top to bottom and left to right. However, one participant did not follow the reading order and started the description diagonally, from the left top corner to the bottom right corner, and vice versa.

One of the participants designed a moodboard with cut-out texts from the printed magazines that call for action: "It's not about the effect, the methods or how long," "Takes a risk," and "Show who you are!". These concepts are considered to have a structural relationship with responsibility and the courage among the staff to add information on a VM board: "...it is good that you dare to stand up for what you add on the board...dare to show that you dare to think and so on." (Participant no 5). Participant no 6 combined the picture of a staircase with the text "gentle and long-lasting" and "Procedure" and explained the combination of picture and text as a metaphor for a sustainable and long-term way of working. Participants no 4 and no 7 added handwritten and cut-out text redundant to the pictures. For instance, one moodboard depicted color samples combined with the texts: "Color scale." A few texts have no direct (spatial) connection to a picture, and texts are also combined with other texts; for instance, the handwritten text "team spirit" is combined with the cut-out text "It is more fun zis way." Overall, the correlation between text and pictures is weaker than the interplay between pictures, which dominates the participants' descriptions and explanations of the moodboard designs.

### **5.1.6. The participants' overall experiences of the design process**

When the project ended, the participants agreed that the design methods, such as creating moodboards, supported them in being artistic, which is not a part of their everyday work as sociologists and behavioral scientists (Development manager; Participant no 1.). The participants experienced the participatory design process as enjoyable. However, at the beginning of the project, they found it difficult to imagine what they could contribute to the design process, or what the design

methods could result in. It is exemplified by quotations from Participant no 5: “*I thought it was really hard in the beginning...*” and Participant no 3: “... *what should I contribute, to cut’n’paste?...but it was such fun...*”. The methods applied in this study were new to them. One of the participants (no 6) assumed the design process could be challenging to grasp because they are non-designers. However, according to the participants, the possibilities offered by the design methods became more apparent when using them and when the project progressed.

## 6. Discussion

In this study, managers and co-workers created visual output (i.e., moodboards) in a collaborative workshop when being involved in the process of designing visual information regarding workload for their future VM boards. The moodboards are approached as visual images and mainly consist of naturalistic pictures, most likely because they were constructed using pictures from printed magazines and publications. The dominant visual elements (in number) are pictures representing vegetation and element of nature, for instance, flowers, leaves, and stones, besides household items and other familiar artifacts, such as kitchen items and furniture. Additionally, there are people in various situations in the pictures, individually or in groups, for instance, exercising and laughing. The moodboards also represent color schemes that highlight nuances of yellow, green, red, and blue colors.

The analysis of the findings demonstrates how the participants perceive the visual output they created, in this case, the moodboards, and the characteristics of such output from the participants’ point of view. When the participants orally explain the moodboard designs, they share a diversity of underlying concepts and thoughts about well-being at work, as a starting point for designing information regarding workload. These concepts were mainly expressed as structural metaphors, and in some cases as orientational and physical metaphors, as defined by Lakoff & Johnson (1980). However, such conceptual metaphors may also be visually embodied (Kövecses 2010). In this case, it refers to the moodboards’ visual elements, their disposition, and the moodboard as a coherent visual image. In the analysis of the findings, four extensive conceptual metaphors have emerged that relate to various visual expressions regarding work-related well-being and aspects of workload:

- Metaphors that highlight concepts such as tranquility, relaxation, recovery, and caring. Images of vegetation and elements of nature, such as trees, grass, flowers, bushes, petals, berries, and leaves visually embody these metaphors, including pictures with household items and other familiar artifacts, such as loungers and teacups.
- Metaphors of concepts regarding work innovation, development, and collaboration. Images representing familiar artifacts, such as a stair, a make-up box, and hand controls on game consoles, visually embody these metaphors.
- Metaphors referring to concepts regarding spirit, enjoyment, and prosperity among individual workers, teams, and the department are visually embodied through images representing people. It may be individuals or people in groups when being, physically active, exercising and playing, and/or being close to each other, smiling, and showing friendly emotions and feelings.



- Metaphors representing concepts of desired or future work conditions and work atmospheres are visually embodied by colors such as nuances of green, yellow, red, and blue. The colors are part of images with vegetation and household items and other familiar artifacts or appear as separate color schemes.

When the participants explain the moodboards' visual elements and their disposition to each other, they function as narrators. They tell stories regarding wellness and well-being at work. Recurring in that story is the importance of cherishing good health, a joyful and collaborative work environment, and a sustainable work situation with a strong team spirit. The stories also reflect the desired atmosphere of a workplace and related norms and values. In this case, the conceptual and visual metaphors and the storytelling construct the ethos of the team/department. This ethos is expressed visually by the VM board within an organization (Söderlund & Hansson 2021, cf: Wæraas & Ihlen 2009), which is relevant to recognize when designing the VM board information.

It is relevant to consider whether the metaphors and the stories created by the managers and co-workers in the study contribute to an empathic approach. In an empathic design approach, as described by Kouprie & Sleeswijk Visser (2009) and Ho & Lee (2012), it is essential to put oneself in someone else's shoes when designing. When the participants in this study explained their moodboard designs they expressed their knowledge, experiences, emotions, and feelings about the subject covered by the information to be designed. In this way, the participants empathized with each other and others in their work context. Additionally, such an empathic approach is relevant to the participants' encounters when designing together. As suggested by Söderlund & Evans (2022), encountering is a prerequisite for design relations, which may encourage the participants' dialog.

Previous VM literature states that a visual approach to work-related information contributes to effective communication in an organization (e.g., Murata 2021). Visual information in VM is considered accessible and comprehensible (e.g., Eaidgah *et al.* 2016; Galsworth 2017; Singh & Kumar 2021) and supports the personnel's engagement (e.g., Liff & Posey 2004; Bititci *et al.* 2015; Eaidgah *et al.* 2016). However, it is essential to consider the role that conceptual and visual metaphors play both in the understanding of VM information and when designing such information. Increased knowledge among practitioners and professionals about the role of metaphors can facilitate the evaluation of visual information and its effectiveness, particularly on VM boards.

According to Kövecses (2010), the conceptual metaphor derives from a diverse range of human experiences. The analysis of the findings highlights that metaphors expressed by the managers and co-workers in this study also illuminate problems with new types of information visualizations. An example that appears in the findings is the color scheme reflected by the moodboards. The color scheme partly refers to a conventional color code in VM, a traffic light metaphor in green, yellow, and red that symbolizes results and conditions. However, in this study, the participants' explanations of the colors were partly different from the conventional meanings, since the colors also denoted a workplace atmosphere, participants' desires, and positive and negative feelings regarding the work context. Such ambiguity in color semantics needs to be considered when designing new types of information visualizations on VM boards since it affects the comprehension of work-related information on such boards.

The participants in this study were non-designers, and it was difficult for them at the beginning of the process to imagine the contribution of their participation. It is essential to develop participatory design methods in VM that enable the participants to be involved and contribute to the design process and its outcomes. In addition, the participants' views, opinions, and ideas in the participatory design process need to be utilized, as discussed by, for instance, Ehn (1992) and DiSalvo *et al.* (2017). In this study, moodboards were applied as one participatory design method to involve managers and co-workers in the process of designing and visualizing VM board information. However, to recognize the participant's contribution to the design process, the visual output they generate needs to be analyzed.

According to Eckert *et al.* (2013), the analysis of moodboards requires interpretation skills. An image interpretation method was therefore applied in this study to investigate the denotative and connotative aspects of moodboards generated in a participatory design process. In addition, theories about conceptual and visual metaphors have been applied to analyze the participants' conceptual and visual thinking related to moodboard designs. Without basic knowledge regarding these or similar methods and theories, participants' design contributions may not be recognized at a deeper level. Consequently, their influence on the design of VM board information may be compromised. If the participants' design contributions become under-utilized, there are questions then whether and how this affects their understanding and use of this information. This is especially crucial since the VM board is intended to involve personnel in work organization and to continuously improve the development of the workplace and the activities and performances therein.

## 7. Conclusions

In VM literature, visuals and visual information play a significant role. Additional visual studies are needed in the VM literature (e.g., Davison *et al.* 2015; Beynon-Davies & Lederman 2017; Eriksson & Fundin 2018), including design studies and research (e.g., Fenza *et al.* 2021; Söderlund & Hansson 2021). This paper presents a study that emphasizes a participatory design approach to the design and visualization of work-related information on VM boards. The personnel use such boards to create, plan, and follow up on work activities and the performances of teams, departments, and the organization, including the ongoing development and improvement of the same. This paper focuses on the visual output, in this case, the moodboards, created by managers and co-workers in collaborative workshops while participating in the process of designing and visualizing VM board information regarding workload. The research questions are concerned with how managers and co-workers perceive the visual output they generate during the design process and the characteristics of such visual output.

A suggested conclusion drawn from the study is that managers and co-workers perceive the visual output they generate metaphorically when involved in the process of designing VM board information. In the study, the participants' visual outputs were moodboards based on various fonts, texts, graphical shapes, and pictures. The pictures represented vegetation, household items and other familiar artifacts, as well as color schemes and people, individually and in groups, in action, and in interactions. Conceptual metaphors are articulated when orally explaining

such a moodboard design, and metaphors are visually embodied by the moodboards, their elements, and dispositions. In the context of VM board information regarding workload, such metaphors could emphasize desired work conditions and atmospheres, work progress and development, and well-being attributes and characteristics of the individual worker/team/department. This represents core concepts and notions regarding the specific VM board information to be designed, which is aligned with the theories of Lakoff & Johnson (1980), see also Kövecses (2010). Such core concepts and notions form a basis for information design decisions and ideas to be further developed and evaluated by the participants or other stakeholders.

Tentatively conclusions drawn from the study are that the visual output (in this case, moodboards) generated in a participatory design process evokes stories shared by the participants. The stories, combined with the conceptual and visual metaphors, reinforce the participants' ability to think, express, communicate, and establish desires, visions, themes, and objectives regarding the work atmosphere, and norms and values governing the workplace. In addition to providing a basis for the information design, the metaphors and stories contribute to an awareness of the work context and to what and for whom the participants are designing. In addition, the metaphors and stories support the participants in encountering and understanding (each) other's points of view regarding the work context and design situation. It is the basis for an empathetic design approach when designing visual information on VM boards with non-designers.

According to Bjögvínsson *et al.* (2012), the visual output generated in a participatory design process may facilitate participants' communication and involvement. Through theories emphasizing metaphorical thinking, conceptual and visual metaphors, and image interpretation methods, this paper demonstrates how participants' visual output generated during the design process can be illuminated, explained, and recognized on a deeper level. Theories and methods established in visual studies and design research are required in the participatory design of VM board information a) to involve and include managers and co-workers, as non-designers, in the design process and b) to make use of their contributions during the participatory design process. If not, the involvement of participants may not reflect a democratic spirit, which is one of the core values of VM and the participatory design approach.

## 7.1. Limitations and future research

This study illustrates how metaphors and storytelling are used by non-designers to explain the visual output (in this case moodboards) they created when involved in the process of designing VM board information. Furthermore, the study demonstrates how theories of metaphorical thinking and conceptual and visual metaphors can be applied to illuminate the visual output created by non-designers. The use of metaphors and narratives may differ across socio-cultural contexts and on the type of information to be designed. The findings in this paper are based on a single case study. Additional studies, for example, multiple case studies and extensive interview studies, are needed to investigate further the relationship between participatory design, metaphorical thinking, and the visual output generated by participants. Besides, further studies are needed to investigate the

possible impact such output may have on participants' interpretation, comprehension, and use of VM board information.

There is a need for future studies combining theories and methods to analyze and explain the visual outputs generated by participants when involved in designing VM board information. Beynon-Davies (2018) proposes a semiotic approach to VM studies based on Peirce's sign relations, which can be combined with the metaphorical approach suggested in this paper. Other relevant theories are visual rhetoric and visual narration, which can be applied to explore and explain the visual output generated in a participatory design process. It can be questioned whether a non-professional can interpret and analyze such visual output like a researcher or trained designer. There is a need for future studies regarding participatory design methods in VM, whose outputs are easy to analyze from the participant's point of view. Otherwise, the participatory design of VM boards may not become a democratic process at its full potential that equally includes users, such as managers and co-workers, but a design process that requires an exclusive interpreter.

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