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EXPECTATIONS AND PERCEPTIONS – DAILY MANAGEMENT MEETINGS IN DESIGN

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ABSTRACT

Daily Management (DAM) has generated many benefits in construction, but it has been less used and studied in design management. This case study of a Finnish structural design firm provides insights into the expectations of designers regarding DAM and Daily Management Meetings (DMM), as well as their perceptions during a short experiment on implementing DAM and DMM in daily structural design work. The research data for the case study were collected through interviews, observation, and a survey conducted with the company's larger structural design group. The main expectations of survey respondents and interviewees included improving the identification of design constraints, ensuring and enhancing the flow of information and increasing trust and team spirit. Interviewees who participated in the experiment highlighted the importance of being able to estimate their own workload and task duration, as well as gain improved knowledge of the concurrent work of other team members. Interestingly, in a larger group with many design managers, the benefit of improving the evaluation of each designer's workload was not anticipated as a significant benefit. This study contributes to highlighting DAM's implications for designers' self-management of their work.

KEYWORDS

Lean construction, construction design process management, daily management, daily management meetings, design management

INTRODUCTION

Efficient construction design process management (CDPM) is hindered by several different factors, such as poor communication among team members (Sousa et al., 2017; Galaz-Delgado et al., 2021), lack of trust (Uusitalo et al., 2019), inefficient information flow (Pikas et al., 2020), and insufficient knowledge of process' progress and others' work (Tauriainen et al., 2016; Svalestuen et al., 2018). These challenges can be mitigated by utilizing lean design management (LDM) (Tauriainen et al., 2016; Pikas et al., 2020; Fosse & Ballard, 2016).

An important part of lean-based management is daily management (DAM), which consists of many different tools, methods, and practices (Nicholas, 2018; Charron et al., 2014; Kennedy, 2019). One of the essential practices of DAM are daily management meetings (DMM) (Kennedy, 2019; Nicholas, 2018).

Daily meeting practices have been adapted and utilized in many different fields for a long time compared to the construction industry (Mariz et al., 2019). In recent years, the effects of DMM have begun to be more widely studied in the construction industry (Wandahl et al., 2023;

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Zender & de Soto, 2021). Studies carried out in the construction industry have yielded many promising results regarding the benefits of DMM. There have, however, only been a few studies conducted in the context of CDPM (Lappalainen et al., 2022; Streule et al., 2016). While these studies have identified the positive effects of DMM, such as improved communication among design teams and enhanced detection of constraints, they do not specifically focus on the benefits and drawbacks of DMM. Both aforementioned studies, in addition to examining DMM, discuss various other practices and tools. This broad scope limits the extent to which the results can be attributed solely to the DMM. The aim of this study is to address this research gap.

DAILY MANAGEMENT

DAM is an important tool of Lean management (Liker & Convis, 2012). DAM aims for efficient process execution and monitoring and for the continuous improvement of operations (Kennedy, 2019; Charron et al., 2014; Nicholas, 2018). This is pursued via various tools, methods, and practices. Of these, the following are the most relevant and most discussed in the Lean literature: Appropriate Measures, Daily Management Meetings, Visual Management, Leader Standard Work, Problem-solving & Learning, and Tiered Accountability. (Kennedy, 2019; Nicholas, 2018; Charron et al., 2014; Liker & Convis, 2012; Gao & Low, 2014.)

According to Nicholas (2018) and Kennedy (2019), DMM is an especially important part of DAM. Nicholas (2018) also points out that the comprehensive implementation of DAM is a long process that changes the operating culture of the entire company. Therefore, it is not recommended to try to implement all the tools and methods of DAM at once; instead, the process should start by trying out individual tools, such as DMM, and adapting them to suit the company's operations (Nicholas, 2018).

DAILY MANAGEMENT MEETINGS

DMMs usually consist of briefly discussing the previous day's performance and possible challenges, as well as setting goals for the coming day and ensuring that the work can be carried out without problems. The goal of a DMM is to enhance the identification of different problems and constraints related to the work, thus enabling problem-solving, learning, and continuous improvement, which is the ultimate purpose of DAM. (Kennedy, 2019; Nicholas, 2018; Charron et al., 2014; Gao & Low, 2014.)

DMM has been implemented and applied in many different fields for a long time compared to the construction industry (Mariz et al., 2019). The effects and benefits of DMM have been studied over the years, especially in the manufacturing industry (Poksinska et al., 2013; Wester & Hitka, 2022), in the healthcare sector (Donnelly et al., 2017; Schatz & Bergren, 2022), and in the software development industry (Stray et al., 2016). These studies have found that implementing DMM improves communication and information flow, enhances the identification of constraints and problems, increases the team members' awareness of the progress of the process, enhances the team members' commitment, and increases trust and team spirit.

DAILY MANAGEMENT MEETINGS IN CONSTRUCTION

In the construction industry, lean construction is often associated with the Last Planner System® (LPS), which was developed in the industry in the early 1990s for project production control (Daniel et al., 2015; Ballard, 1994). Since then, LPS has started to be used in the industry not only for production control but also as an aid for CDPM (Fosse & Ballard, 2016; Daniel et al., 2015). LPS is based on versatile, structured, complementary, and regularly held meetings on a monthly, weekly, and daily basis (Fosse & Ballard, 2016; Hamzeh et al., 2009). Although daily meetings have been part of LPS for over 20 years (Ballard & Howell, 2003), research into

their benefits has remained remarkably low in the construction industry compared to many other industries (Mariz et al., 2019; Wandahl et al., 2023).

Although studies that deal at least in part with DMM can already be found in the construction industry in the early 2000s (Salem et al., 2005), similar studies have become more common only in the last 10 years or so. Only a very small part of these studies (Wandahl et al., 2023; Ghosh, 2014) deal exclusively with DMM and their effects. In most of the studies where DMM is a part of the topic, DAM is reviewed comprehensively (Mariz et al., 2019; Lappalainen et al., 2022) or different Lean construction tools and their effects are compared (Salem et al., 2005; Noorzai, 2023). The use of DMM has increased in construction sites in recent years with the implementation of Takt production (Dlouhy et al., 2016; Haghsheno et al., 2016). Keeping pace and the quick reaction it requires are ensured with the help of daily Takt meetings (Haghsheno et al., 2016).

In studies conducted within the construction industry, DAM and DMM are often reviewed in relation to Lean and LPS (Wandahl et al., 2023; Gao & Low, 2014). However, in recent years, DMM has also been implemented in construction projects via the Scrum system originating from the IT sector based on Agile management (Streule et al., 2016; Zender & de Soto, 2021). Although there are several differences between LPS and Scrum and their use, the systems are relatively similar in terms of DAM and DMM (Lappalainen et al., 2022; Zender & de Soto, 2021; Streule et al., 2016).

Implementing DMM has yielded many of the same benefits in the construction industry as in other industries. The most relevant of these are related to increasing and improving communication between team members (Salem et al., 2005; Ghosh, 2014; Streule et al., 2016) and to the developed ability of teams and individuals to identify and solve problems and constraints (Mariz et al., 2019; Lappalainen et al., 2022; Noorzai, 2023). Streule et al. (2016) and Ghosh (2014) also identified as one of the positive effects of DMM that it helps team members get a better understanding of what work others are doing, which also increases understanding of the entire process and its progress.

Based on the results achieved in the construction industry, as well as in other fields, DMM could potentially reduce many of the challenges of CDPM. However, most studies in the industry that deal with DMM are limited to construction. Despite a few isolated studies (Lappalainen et al., 2022; Streule et al., 2016), DMM or DAM in general have not yet been extensively researched in the context of CDPM. Therefore, the aim of this research was to investigate the benefits and possible drawbacks of DMM in CDPM. The investigation is based on interviews, a survey, and a case-project experiment.

METHODS

The research method chosen was a case study of the structural design unit of a Finnish engineering firm. In the case study, a survey and six semi-structured interviews (SSIa) were first conducted to elicit expectations of the benefits and possible drawbacks related to DMM. The survey and interviews focused on the staff of the regional offices. After investigating the expectations, a week-long experiment was carried out in a case project to investigate the perceived benefits and drawbacks of DMM. Related to the experiment, data were collected via participant observation, as well as four semi-structured interviews (SSIb). The experiment and interviews were conducted with a small design team in one of the offices.

The case study aimed to obtain a real-world perspective on the relationship between expectations and perceptions of DAM and DMM in a design context (Yin, 2018). According to Yin (2018), case studies are essential for explaining real-world interventions and illustrating specific themes of evaluation. The design firm chosen as the case study is part of a joint industry–university research consortium of researchers and the Finnish construction industry (Lavikka et al., 2020), and when researchers asked for volunteers in the consortium workshop,

the case company representative volunteered their company for the study. The company employs about 2200 people and has a turnover of about 220 M€.

The questions of the semi-structured interviews (SSIa) and the survey related to expectations were designed based on a literature review. Feedback on the survey questions was requested and obtained from the development manager of the case study company. The survey and interviews aimed to find out what people's expectations are regarding the benefits and drawbacks associated with DMM. It was possible to participate in the interviews face-to-face or via the Microsoft Teams application. The responses were grouped into themes. The survey was conducted on a company development day using the Mentimeter electronic survey tool. At the beginning of the event, the lead author introduced the background information of the survey to the participants. The survey results were reviewed with the participants during the event, and the data were evaluated separately by the researchers after the event. The theming was done in an Excel spreadsheet.

In the case project chosen for the experiment, DMM had not been utilised before, and the participants had no previous experience of DMM. The lead author conducted participant observations during the meetings and wrote down observations in field notes, which, according to Flick (2006), is the most common and effective way to document observational data. The questions of the semi-structured interviews (SSIb) were designed to elicit the experiences of the participants in the experiment regarding how they perceived the use of DMM in their design work. The interview questions were developed based on the observations made during the experiment as well as the information obtained earlier related to the expectations. The interviews were recorded and transcribed. It was possible to participate in the interviews face-to-face or via the Microsoft Teams application. The interview responses were evaluated and grouped into themes in an Excel spreadsheet. The research process is presented in Figure 1.

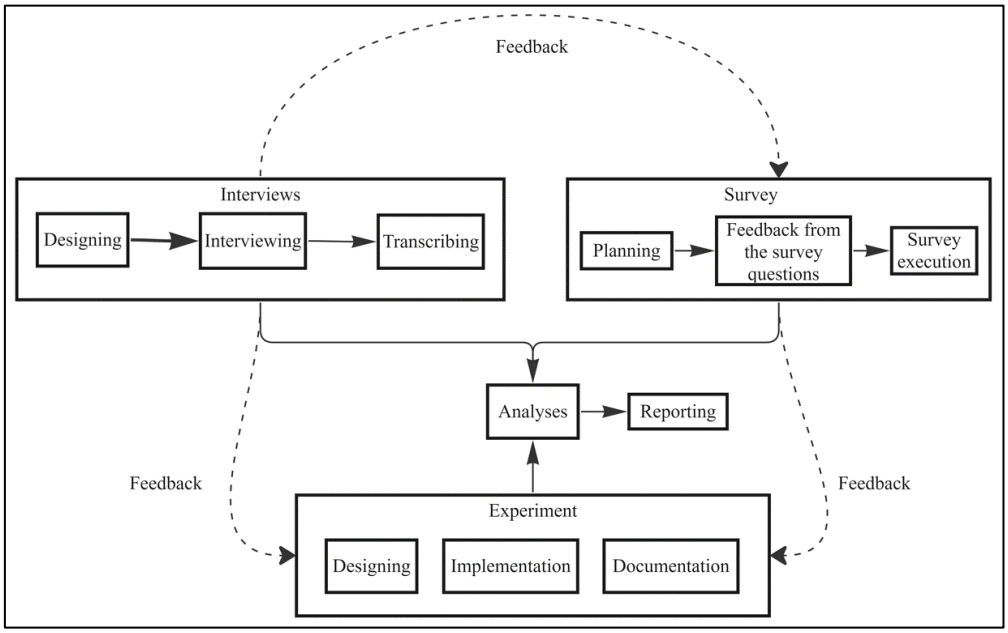

Figure 1. Research design.

This study uses a combination of research methods, which increases the validity of the study by examining several different perspectives, with common points indicating a closer description of reality, as Jack and Raturi (2006) argue. By triangulating results from literature reviews, interviews, and surveys, the inherent weaknesses of each method are compensated for, following the approach recommended by Turner et al. (2017). As argued by Yin (2018), the findings and conclusions of the case study gain reliability from being drawn from this diverse set of data sources rather than from individual methods.

FINDINGS

In this section, expectations regarding the benefits and drawbacks of DMM are presented. These were elicited using a survey and interviews (SSIa). The survey was conducted during a 1-day design manager workshop. The interviews were conducted over a period of 45 days. Two of these were carried out face-to-face, while four were held remotely via Microsoft Teams. All interviews were recorded and subsequently transcribed. The longest interview lasted 72 minutes, and the shortest was 27 minutes in duration. On average, the interviews lasted 44 minutes.

After presenting the main expectations, the results of the experiment are reviewed. The experiment aimed to obtain information about the perceptions of DMM in a real context by implementing them in a case project. The results were elicited by interviewing (SSIb) the members of the case project. The lead author also participated in the DMMs held during the experiment as an observer. This enabled the investigation of possible challenges and drawbacks related to DMM and its implementation. The interviews were conducted over a period of 4 days, and two of them were held face-to-face, while the other two were held remotely via Teams. Again, all interviews were recorded and subsequently transcribed. The longest interview lasted 26 minutes, and the shortest was 15 minutes in duration. On average, the interviews lasted 20 minutes.

EXPECTATIONS

A survey (n=34) and interviews (n=6) were utilized to determine expectations regarding the benefits and drawbacks of DMM. Table 1 presents the themes that came up the most regarding the benefits, as well as the proportions of answers related to them.

Table 1: Expected benefits of daily management meetings

Theme	Survey (n=34)	Interviews, SSIa (n=6)
Improves communication	6 %	83 %
Enhances information flow	18 %	67 %
Enhances identification of dependencies between tasks	12 %	17 %
Ensures workflow	15 %	50 %
Improves assessment of own workload	6 %	-
Enables better monitoring of progress	9 %	33 %
Enhances identification of constraints and problems	24 %	-
Increases trust and team spirit	12 %	33 %

There is a noticeable distribution in the answers to the survey and the interviews regarding which themes were emphasized the most. For example, only a small portion of the survey answers (n=34, 6 %) related to improving communication, while in the interviews this theme came up distinctively the most (n=6, 83 %). In the survey, enhancing the identification of constraints was seen as the greatest potential of DMM (n=34, 24 %), while in the interviews this theme did not come up directly at all. Themes that received a relatively large number of responses in both sets of collected materials were enhancing information flow, ensuring workflow, and increasing trust and team spirit.

The survey and interviews also aimed to obtain information about the expected challenges and drawbacks of DMM. In the survey, there were fewer responses (n=30) regarding these compared to the benefits (Table 1). Table 2 presents the themes that came up most regarding

the drawbacks, as well as the proportions of answers related to them. The implementation of DMM is expected to be challenging, especially due to time constraints. In the interviews, the most cited (n=6, 67 %) drawback of DMM was that they would take too much time away from other daily work. The problem of finding a standard time that suits everyone every day was frequently mentioned in both the survey (n=30, 33 %) and the interviews (n=6, 50 %). One of the reasons identified in the survey (n=30, 13%) for this drawback is that designers and project managers often work on several different projects simultaneously.

Table 2: Expected drawbacks of daily management meetings

Theme	Survey (n=30)	Interviews, SSIa (n=6)
The meetings require too much time daily	17 %	67 %
Challenging to find a time slot that suits everyone's schedule	33 %	50 %
Difficult to get everyone to commit to the practice	20 %	50 %
Challenging to get designers to critically evaluate their own work and performance	10 %	33 %
Designers may experience the practice as an excessive supervision of their performance	7 %	17 %
There might not be new things to go through in the meetings every day	7 %	33 %

As can be seen in Table 2, there are also expected to be many other drawbacks regarding DMM. In two interviews, it was discussed that it can be challenging to get people to commit to the practice due to the other challenges presented in Table 2. In the survey (3 responses, 10 %) and in one of the interviews, it was pointed out that DMM might be perceived more openly if everyone was aware of their benefits.

PERCEPTIONS POST-EXPERIMENT

A week-long experiment was conducted to obtain concrete results about the benefits and drawbacks of DMM. In the experiment, DMMs were implemented in a structural design case project, where a similar practice had not been utilized before. The main project team consisted of four members. The case project members were interviewed (SSIb) after the experiment to determine how they perceived the DMM. Table 3 presents the key perceived benefits that stood out in these interviews.

DMM were consequently perceived to have positive effects especially on the planning and execution of work tasks. This was also felt to have a positive effect on the ability to estimate the amount and duration of work. The design project manager also found it to be beneficial that with DMM, they knew more precisely every day what everyone was going to do, as this made it easier for them to follow the progress of the process more closely.

The DMM experiment was conducted efficiently in terms of time-consumption. The average duration of the meetings was only 8 minutes, with the shortest lasting 6 minutes and the longest lasting 11 minutes. This, to some extent, refutes the expectation that DMMs require a lot of time each day.

Table 3: Key perceived benefits of the daily management meeting experiment

Key perceived benefits	Interviews, SSIb (n=4)	Extracts from interviews
Facilitates the planning and execution of work tasks	75 %	*"…easier to plan and complete your own work…each day. Working is also more efficient when you think before you do."*
Develops the ability to evaluate workload and task durations	50 %	*"… clearer picture of what you were going to do that day…easier to estimate how much time the work required."* *"… you can also regularly observe in the meetings whether your own estimations have gone right or wrong, which further develops your assessment ability."*
Helps especially the project manager in monitoring the progress	25 %	*"[The project manager] could hear and see what goals everyone set for the day, and how the tasks were going, which made it easier to keep in track with the process progress."*

Although the DMM experiment was successfully implemented, there were also some drawbacks associated with the new practice. Perhaps the most significant challenge that emerged during the experiment was scheduling a meeting that all members of the case project team could attend. While there were no days when no one attended, there was almost always at least one team member with scheduling conflicts, often due to other meetings or site visits. One of the most expected drawbacks of DMM was that it could be challenging to find a time slot compatible with everyone's schedule. The experiment's findings thus confirm that this is a real obstacle. In contrast with construction workers, designers tend to have several meetings during the day, for instance, with other designers or with the client. They also often work on several projects at the same time. The project manager of the case project recognized in their interview that flexible working hours also pose a challenge for scheduling DMMs. Holding these meetings first thing in the morning ensures that there are no interruptions in the workflow (Ghosh, 2014; Wandahl et al., 2023). However, this is quite difficult in design offices compared to construction sites, where workers typically arrive at the site at the same time, as employees in design offices may start their workdays at different times. Finding a common time is, therefore, particularly difficult in design.

Observations of the meetings revealed that the same topics and issues were frequently discussed, often without significant new additions. This issue also emerged during the investigation of the expected drawbacks of DMM, as noted in Table 3. In their interviews, the majority of the case project team members (3 out of 4) attributed this to the compact size of their project team. They noted that they naturally discuss things with one another even without the necessity of DMM.

DISCUSSION

This exploratory study showed that various benefits can be achieved by implementing DMM in CDPM. The findings propose that the main expected benefits of DMM include improved workflow, better information flow, and enhanced trust and team spirit. The findings from the experiment reveal that DMM facilitates more efficient planning and execution of work tasks,

aids in evaluating the amount and duration of tasks, and is particularly beneficial for project managers in monitoring progress. These outcomes generally align with the initial expectations, highlighting DMM's positive impact on design management efficiency. However, while one of the main findings of the experiment was that DMM had positive effects on the participants' ability to evaluate their own workload and task durations, this theme only barely came up in the survey (n=34, 6 %). It is also noteworthy that there were no remarks relating to this theme in the six interviews (SSIa) regarding the expected benefits. There can be several different explanations for this. The prominence of this theme in the experiment may be attributed to factors such as the type of case project and the working methods of its members.

The findings also indicate that there are various design-specific challenges and drawbacks associated with DMM. Based on the responses from the survey and interviews (SSIa), it is expected that DMM will consume too much time from other daily work. The findings from the experiment refute this expectation, with the average duration of the held meetings being under 10 minutes. However, it is important to consider the compact size of the case project team. The meetings could be quite easily kept short, since there was usually not much to discuss with only a few participants involved. Numerous studies, particularly those focusing on Scrum, emphasize the importance of using a pre-prepared agenda to maintain efficiency in DMM (Stray et al., 2016; Streule et al., 2016). Using a ready-made agenda could be recommended, especially with larger project teams, where the scope of discussion can be more extensive.

The findings show that integrating DMM into everyone's schedule is expected to be particularly challenging. The experiment confirmed this common expectation, as finding a suitable time for everyone proved particularly challenging. This was primarily due to issues specific to design, such as flexible working hours and members working simultaneously for multiple projects. Unfortunately, there is no direct solution to this challenge. Stray et al. (2016) suggest that DMM should be organized in a manner that minimizes disruption to team members' daily work. The most suitable time for DMM consequently depends on the situation and should be agreed upon collectively by the project team before implementing the practice. Although it would be useful to hold a meeting first thing in the morning to ensure an efficient workflow, as previously discussed, the meeting can also be scheduled later in the day if it better accommodates everyone's schedule. For instance, Stray et al. (2016) noted that their study's case project team found holding a meeting just before lunch to be the most effective practice. This timing could perhaps also be more suitable for design teams that operate under flexible working hours.

While the findings of this study provide valuable insights into the benefits and challenges of DMM in CDPM, there are some limitations and areas for improvement. First, the study's focus on a single design unit of a Finnish engineering firm may limit the generalizability of the findings. Cultural and organizational factors specific to the firm may influence the outcomes, which might differ in other contexts. Second, the experiment period was relatively short, which may not capture the long-term effects and adaptations of the DMM practice. The experiment focused on only one case project, which also limited the generalizability of the findings. However, the validity and reliability of the related findings was increased by combining several data collection methods (Turner et al., 2017). This was realized in both phases of the empirical research process, as data related to the expectations were collected by combining interviews and a survey, and data related to the perceptions were collected by combining interviews and observation. Finally, the study relies heavily on qualitative data from interviews and a survey, which, while insightful, may benefit from the inclusion of quantitative measures to provide a more comprehensive analysis.

The findings of this research are relevant and valuable for both industry and academia. For the construction industry, this study establishes that various benefits can be achieved by implementing and utilizing DMM in CDPM. Previous research in the industry has yielded many

promising results regarding the benefits of DMM and DAM in general (Wandahl et al., 2023; Mariz et al., 2019; Lappalainen et al., 2022; Ghosh, 2014). The findings of this study generally align with the results of previous research. For instance, Lappalainen et al. (2022) found that the reliability of task execution increased when DMM and DAM were implemented. The findings obtained through the practical experiment in this study align with this, thus validating the results of Lappalainen et al. (2022). The experiment also demonstrated the positive effects DMM have regarding the work of the design project manager. This, in turn, confirms the results of Wandahl et al.'s (2023) study, according to which DMM facilitates construction site managers' work and time management.

Although the effects of DMM have been researched in the industry, the topic has not yet been extensively researched in the context of construction design processes. This study affirms that the positive results achieved on the production side of construction are also valid in design, although there are unique challenges, such as finding a common time. Consequently, the study provides a general basis for the topic, and the findings can be used as an aid for further research, thus alleviating the research gap.

The topic can be approached from many different perspectives, offering numerous avenues for further research. For instance, comparing the effects of DMM across different design processes in the construction industry could illuminate the generalizability of the benefits and applicability of DMM within the CDPM context. Another compelling topic for future research would be investigating whether Wandahl et al.'s (2023) findings on DMM's impact on construction site crew productivity are also applicable to construction design teams. To ensure a robust and comprehensive analysis, such research could benefit from utilizing quantitative methods or a combination of qualitative and quantitative approaches.

Hopefully, this short paper will inspire design project managers to explore the use of DMM, perhaps in conjunction with other DAM practices, in their future projects. Broader adoption of such practices would facilitate advancing the much-needed further research on the topic.

CONCLUSION

This study aimed to investigate and compare the expectations and actual experiences of DMM in CDPM, consequently addressing a significant research gap in the field. This objective was pursued by conducting a case study of the structural design unit of a Finnish engineering firm.

The findings obtained through a survey and interviews showed that various benefits are expected to be gained when implementing DMM in design. Based on this study, these expectations are especially related to enhancing information flow, ensuring workflow, and increasing trust and team spirit. The findings also show that there are various expected challenges regarding the implementation of DMM in design. These especially relate to time consumption and scheduling.

The findings obtained through a practical experiment showed that DMM facilitates the planning and execution of work tasks, which in turn develops the ability to assess workload and estimate task durations. DMM can also help, especially the project manager, to monitor the progress of the process. The experiment also confirmed the expected challenges regarding the scheduling of meetings, proving that finding a common time for DMM is particularly difficult in design.

Although the research has some limitations, the findings provide valuable insights regarding the benefits and drawbacks of DMM in the context of construction design processes. Therefore, this study can be used as a basis for more comprehensive further research.

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