sustainability

MDPI

Article

Meeting Design Supporting Sustainability in Early Planning Practice: A Combination of 'Hard and Soft' Characteristics

Elise Grosse [1,*] and Paula Femenias [2]

[1] Department of Real Estate and Construction Management, School of Architecture and the Built Environment, KTH Royal Institute of Technology, SE-114 28 Stockholm, Sweden
[2] Department of Architecture and Civil Engineering, Chalmers University of Technology, SE-412 96 Göteborg, Sweden; paula.femenias@chalmers.se
* Correspondence: grosse@kth.se; Tel.: +46-708395614

Abstract: While research on the sustainable built environment has acknowledged the need to integrate multidisciplinary perspectives in the early planning phases, few studies have focused on early-phase meetings and how these can support such co-creation of sustainability. In this study, a set of "characteristics" for collaborative meetings integrating multidisciplinary perspectives was tested in 16 meetings that took place in the early phase. An action research insider perspective was used, where a researcher was also the facilitator of these 16 meetings. The cases provide insights into the early-phase processes where the building industry can achieve sustainable impacts on the built environment. This was exemplified by two of the cases becoming demonstration projects in terms of sustainability. Empirical material was gathered through discussions and surveys with meeting participants and was analyzed through the lens of the meeting design characteristics. The findings show that processes with 'soft' interpersonal characteristics (expressing emotions, tempo change during dialogue, engaging in social interaction, moving the body) support the development of a shared understanding of sustainability that integrates multidisciplinary perspectives. For larger groups and in digital meetings, a combination of 'soft' (interpersonal) and 'hard' (digital communication tools and platforms) characteristics were found to be supportive, especially when the meeting time was limited. This research suggests a revision of the design of multidisciplinary early-phase meetings towards including social, emotional, bodily, and collaborative exercises supported by digital tools.

Keywords: co-creation; meeting design characteristics; sustainable built environment; early planning phase; multidisciplinary; action research

Citation: Grosse, E.; Femenias, P. Meeting Design Supporting Sustainability in Early Planning Practice: A Combination of 'Hard and Soft' Characteristics. *Sustainability* **2022**, *14*, 3159. https://doi.org/10.3390/su14063159

Academic Editors: Nikos A. Salingaros, Alexandros A. Lavdas, Michael W. Mehaffy and Ann Sussman

Received: 9 January 2022
Accepted: 2 March 2022
Published: 8 March 2022

1. Introduction

Developing sustainability for the built environment is an increasingly urgent topic for meeting the Paris Agreement [1] and Agenda 2030 [2]. There are different ways to manage sustainability in the built environment, e.g., through policies and new ways of planning and designing, procuring, and managing construction and the lifecycles of the built fabric. The issue of addressing sustainability for the built environment is difficult, as the way towards sustainability spans over disciplinary borders and different scales. No single actor or organization possesses the knowledge, resources, or capacity to solve the complex, interwoven sustainability problems of the built environment on their own [3,4]. Hence, new modes of inter-professional engagement and communication [5] are required across multiple disciplines and across organizations to enable a sustainable transition of the built environment [6,7]. Multidisciplinary communication and collaboration are essential for integrating sustainability in the design of the built environment [8,9], and this requires a shared understanding of what sustainability should be and how frameworks can be incorporated early in the process [6].

The early 'fuzzy' phases have been highlighted to hold the most opportunities to influence the direction of the design output for the built environment [10]. It is in the early phases that the opportunities to influence sustainability are at their greatest in relation to finances and feasibility, as well as to the establishment of a collaborative arena for multidisciplinary dialogues throughout the overall planning process [11]. The issues that are discussed and prioritized and the requirements that are formalized in the early dialogue phases of planning and initiating projects will affect the design and construction processes in the later phases. If requirements are not dealt with early on, later alterations to the design and construction will cost money and cause annoyance [12]. However, in general planning practice, a normative meeting is conducted around a bullet-point agenda where one question and one discipline is discussed one after another. Such meeting formats have not been developed to support the complex and intertwined issues of sustainability.

The increased uncertainties and intertwined multidisciplinary issues of sustainable planning and design processes have, in Sweden, led the current development towards more transdisciplinary collaboration between the academy and industry. For a decade or more, transdisciplinary approaches have been common in sustainable urban development [13] and have taken the form of large research programs [14–19]. As a method, transdisciplinary sustainable urban development has also gained popularity outside of Sweden [11,13]. The collaborative approaches permit academic institutions to reach beyond campus boundaries and form partnerships with government, industry, and civic organizations to drive urban sustainability transformation [20–22]. In such 'actionable' research initiatives, the role of the academy expands from that of a knowledge producer to become actively involved in collaboration with diverse actors to co-create societal transformations [20]. Research in this area uncovers different key-actor combinations (motivations, roles of participants).

Some of the key actors of the early stages of planning are architects. Architectural practice has been a major driver for developing collaborative dialogue approaches for interdisciplinary and transdisciplinary projects across Europe [13]. The very nature of the architect's role is to have a holistic approach, integrating multidisciplinary perspectives into a functional and aesthetic whole. In Sweden, the dialogue-based methodological development started with workplace design integrating user perspectives in the 1970s. Since then, collaborative approaches involving different actors and disciplines in early phases have steadily increased, especially over the last 5–10 years [23]. In 2020, co-creation was the main theme at the yearly gala for Architects Sweden, a professional organization for architects, interior architects, landscape architects, and spatial planners with over 14,000 members. One elaborated example of such a method that structured the integration of different perspectives on the building project levels during the design phase was 'The Design Dialogue' [24–28]. 'The Design Dialogue' is the result of a transdisciplinary development process driven mainly by Sweco Architects and Chalmers University of Technology and has its background in handling the complexity of healthcare projects. 'The Design Dialogue' can be understood as a series of workshops that engage different multidisciplinary stakeholders in practical exercises that define different design issues. The method has become a general method for addressing multidisciplinary involvement in complicated design processes [27]. A similar concept is the 'charrette', a series of facilitated workshops developed to support collaborative planning, not specifically for the built environment [29]. A charrette is a facilitated workshop that is highly structured and engages participants in dialogue-based exercises to co-create shared understanding and frameworks to drive a specific development, commonly on the municipality level. For city planning, SymbioCity [11] is another methodological approach that integrates multidisciplinary perspectives for planning a city as a system of resources (e.g., energy, waste, water, transportation, greenery). SymbioCity has also become well known outside of Sweden. These initiatives point to the fact that integrating multidisciplinary perspectives through collaborative approaches is necessary in order to achieve sustainable societal development. A way to support this and avoid conflicts of interests is to reach a shared understanding of sustainability at meetings in the early initiative phases. However, few studies that are based on early-phase practice

accentuate how the actual meetings are best designed and executed to manage collaborative working and to support groups in co-creating solutions together, or to find solutions that integrate different perspectives into shared frameworks [8].

Summarizing the above, it is well known within the built environment that the early phases hold the most potential to impact sustainability outcomes. There are enough frameworks and definitions of sustainability out there; what is needed is action. To achieve a truly sustainable built environment, sustainability needs to be created in the initiating phases and in the program phase, more so than during the design phase, where alternation with the brief becomes too expensive. To achieve truly sustainable outcomes, common sustainability goals and visions must be set with all multidisciplinary stakeholders in the very early phases. However, there is not much literature on how this is being done during the initial early-phase meetings. Instead of providing yet another sustainable definition or certificate, the purpose of this paper is to explore how early-phase meetings can create such shared understanding of sustainability if they are designed and facilitated to support interaction. The paper supports the development of collaborative methods by providing insights into the design of meetings, with a special focus on meeting design characteristics that can contribute to actors' engagement and push frontiers to meet great challenges.

This study originates from a transdisciplinary action-research project and the perspective of two architectural firms, where the insider action researcher worked as a facilitator of multidisciplinary meetings in the early phases. The focus is on meetings where different stakeholders with different ambitions for sustainability meet and co-create requirements and design criteria when initiating the planning of a project or building. The research question guiding this study is: What meeting design characteristics support a shared understanding of sustainability that integrates multidisciplinary perspectives in the early phases of developing the built environment?

1.1. Overview of Previous Research

Collaborative dialogue-based approaches that involve multiple stakeholders in developing a sustainable built environment have previously been researched, for example, in the construction management literature. The need for collaborative approaches has been emphasized in this literature; however, in many cases, the conflicts and disputes that characterize stakeholders' relationships have been in focus, rather than collaboration and coordination [30]. The development of trust is a major challenge. In a recent study, Hans Ruijter (2020) [31] examined the development of trust through different phases in mega-projects spanning several years. The study emphasized the importance of early-phase pre-project dialogues (workshops) in which stakeholders could communicate on more free terms (no contracts) and set the agenda for the development of a resilient partnership that could last through the later stages of the project. The literature also mentions features that have been suggested to support collaboration, i.e., trust and open communication [30,32,33], the involvement of key participants early in the process, teamwork, and the alignment of interests [30]. The importance of interplay between formal and informal communication [33] has also been suggested to balance power struggles [34], and more research on relationships in collaborative projects has been requested [35]. Even though collaboration and integrated ways of working are necessary for sustainability [36], the construction management literature does not go into detail about the design of meetings in collaborative projects.

1.2. Meeting Research

In the field of meeting design research, the design of meetings and their important characteristics have been studied. Schwartzman [37] defined meetings as planned gatherings of three or more individuals who assemble for the purpose of work-related interaction. Nearly all organizations rely on some form of teamwork in meetings [38]. Meetings in many sectors dominate knowledge workers' and managers' time, and the use of meetings as a tool for initiating and supporting collaborations has increased across many sectors

and in organizations in general [39,40]. However, according to many studies and reviews in meeting research, e.g., [41–43], meetings are costly, unproductive, dissatisfying, and widely regarded as a source of inefficiency and a poor use of time. Recommendations for future studies among meetings researchers are to study the design characteristics of meetings, e.g., [44–46].

Looking at meeting design, the literature is diverse and heterogeneous, with unstructured characteristics depending on the literature that one reads. Examples of common characteristics that meeting design literature mentions as important for a successful meeting are the distribution of an agenda, the definition of discussion topics, and the setting of clear goals.

A study by Odermatt et al. [47] provided an overview of the meeting research literature and the most common meeting design characteristics. In their review, they examined the effects of meeting design characteristics related to meetings' perceived effectiveness (i.e., a meeting's participants' perception of an effective meeting) and conclude that a low meeting quality is often attributed to poorly planned and poorly led meetings. The most common meeting characteristic is the use of agendas [48]. To be more efficient, an agenda should be disseminated before the meeting, as this allows attendees to make additions to it and to prepare for the meeting [49]. However, regardless of how clear the meeting objectives are or how sensitive everyone is to the dynamics of a discussion, meetings are a complicated matter, and conflicts are very likely to occur during meetings [50]. This is because attendees have different values, functional responsibilities, information, and personal needs (e.g., a physical condition or stressful situation outside the context of the meeting). Other meeting characteristics aside from preparing an agenda are setting a clear goal for the meeting, inviting the right attendees, and conducting the meeting within the specified timeframe. In their review, Odermatt et al. clustered important meeting design characteristics into three groups: (1) temporal characteristics related to how the meeting time is used (e.g., starting and ending on time, pre-meeting talk), (2) procedural characteristics that direct attendees' attention and efforts toward task-oriented activities (e.g., using a written agenda, setting clear goals), (3) physical characteristics that relate to meeting settings and environments (e.g., appropriate venue quality, provision of refreshments), and characteristics of the selection of attendees. Based on the results of their review, they concluded that meeting leaders could design meetings more effectively and facilitate them in a manner that results in better outcomes, and they suggested the exploration of meeting design characteristics in future research.

Another discussed meeting characteristic is the size of the participating group. Cohen et al. [45] found that larger meetings are perceived to be of lower quality than smaller group meetings. These findings support previous research on groups in meeting research, which have indicated that larger groups inhibit individual participation [51] and require more coordination [52]. Although larger groups may have more resources to solve problems (e.g., more diverse perspectives), communication becomes more difficult as the size of the group increases [53]. Looking at research on groups and teamwork, there are also technical and digital tools that can support collaboration and learning in teams: so-called 'group support systems' (GSS tools). Briggs and de Vreede [54] (1997) experimented with GSS techniques within a larger team in order to bypass problems that can occur in a group. With their research, they addressed a well-known group phenomenon in psychology called "group-think" (referring to Janis' research from 1971 on decision making, Kennedy, and the Bay of Pigs), where members of a group imitate each other, the group becomes too coherent, and critical reflection is stopped, which can cause a group to make bad decisions. To avoid too-coherent thinking in a group, Briggs and de Vreede used computers as GSS tools to support methods for anonymous distribution of individual thoughts and ideas in an equal and non-hierarchical manner. However, the computers at the time were large stationary equipment, which had a limiting effect on the group dynamics, as participants had to sit by themselves at each computer station. This research was related to studies on group performance, which showed that even if individual intelligence remains the same,

the collective intelligence of a group (how well the group can solve problems together) can be improved if the group consists of members with diverse perspectives and knowledge backgrounds, yet are able to employ equal participation and good dialogue [55]. The concept of "collaborative intelligence" [55,56] addresses the smart-tech development and the increase in computing power with new ways for individuals to interact in human–computer networks. These new digital formats—i.e., human–computer networks (the most well-known examples Linux and Wikipedia)—can support more equal participation between individuals to share and analyze data. Although such group support technologies can improve task focus, they may create a special demand for facilitation [57].

2. Materials and Methods

2.1. Research Approach

The study is part of an insider action research project with the aim of improving meeting design in service of sustainability in the early phases of planning of the built environment. With a special focus on meeting practice in the early phases, this study explores meeting characteristics that can facilitate the integration of multidisciplinary perspectives and co-creation of visions for sustainable built environments. The insider perspective is that of a researcher, an architect, who designs and facilitates collaborative meetings in the initial phases of architectural practice. The study evolves around 16 meetings that were designed and facilitated by the action researcher from 2015 to 2020 (presented in Supplementary Materials). These 16 meetings were selected from a practice consisting of 70 meetings that were conducted between 2015 and 2020 when the researcher was employed in two large architectural offices in Sweden [58,59]. From these 16 meetings, three meetings are selected and described here in detail, as they illustrate important findings that has led the work forward.

When doing action research, the iterations of designing, testing, and 'reflecting-in-action' [60] form a cyclic action spiral of plan–act–reflect [61]. In this study, meeting design characteristics were developed through iterations of meeting experiments: designing and facilitating meetings and receiving feedback from the meeting participants. At each meeting, the participants were introduced to the action research during the introduction of, and during the meeting, they were engaged in the topic of sustainability. At the end of the meeting, feedback from participants was collected through dialogue in a round-table format, through a digital inquiry (see the example in Section 2.3), or through informal discussions with the participants. Altogether, this feedback deepened the understanding of a meeting design that was perceived as effective and well-functioning according to the participants and the action researcher's own experience. This feedback, together with the ongoing 'reflection-in-action' [60], informed the development of the next meeting. The meeting design characteristics were identified through iterations of designing and facilitating meetings parallel with studies of the literature that supported the reflections (i.e., the action research cycle of 'plan–act–reflect' [61]). The literature covered different fields focusing on human interaction (see Section 2.2). Insights from the literature both deepened the understanding and inspired the testing of new meeting characteristics. In this abductive knowledge process (Figure 1), meeting design characteristics were identified and tested in practice; the experiences, reflections, and feedback from participants informed the next iteration of meeting design.

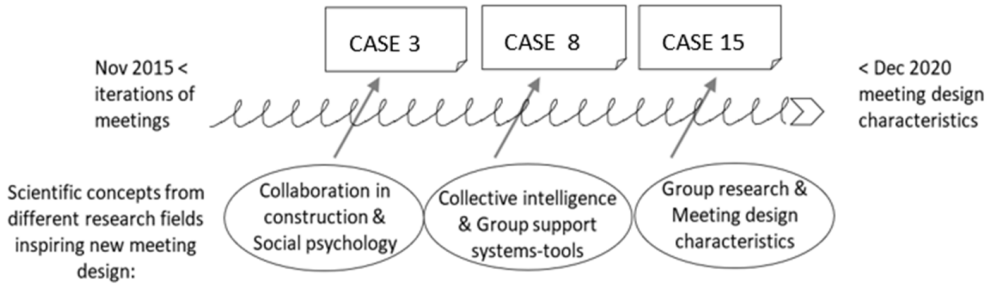

Figure 1. Timeline of the abductive process: spiral iterations of meetings facilitated between 2015 and 2020, literature and feedback from participants informing the action research development, and important key learnings exemplified with three case meetings: cases 3, 8, and 15.

2.2. Abduction: Theoretical Concepts Inspiring New Designs of Meeting Characteristics

To increase the researcher's understanding of issues connected to how humans think, learn, and collaborate in groups, inspiration was taken from fundamental ideas of human cognitive and psychological processes. These concepts both explained and provided insights that inspired the action researcher to develop new meeting design characteristics. One fundamental concept is the social origin of human cognition, which was proposed by Dunbar (1998) as the 'social brain' hypothesis [62]. This concept from evolutionary science provides an explanation of the development of human cognition, which is characterized by the need to handle large groups and social networks. According to this theory, human cognition is mainly of a social character; the human way of thinking has evolved through social interaction in social systems (groups of humans). Humans spend a large amount of cognitive capacity processing these social systems and their relationships (this then explains why our frontal cortex is larger than in other primates) [62]. The 'social brain' concept—the idea that our cognition is mainly of a social character—is also in line with basic research in psychology and education, e.g., the 'Vygotsky theory'—that learning is sociocultural and takes place in relation with other people through interaction and language, the individual experience, and by formulating individual thinking [63]. This notion of relationships and the sharing of perspectives as fundamental to how humans think and learn is also supported by another main figure in the pedagogic literature—Piaget. Piaget found that individual learning takes place in peer-to-peer exploration beyond hierarchical structures of authority [63]. This research in psychology and education points to how human thoughts are shaped and developed through social interplays and dialogue. Dialogue, which is essential to how groups of humans think together ("collective thinking"), is also reflected in studies on group performance [64,65]. The notion of dialogue as a main characteristic of a group's ability to solve problems together, i.e., a group's "collective intelligence", is, according to group performance studies, less correlated with individual intelligence and more linked to the sharing of perspectives (dialogue) and the social sensitivity of group members [65–67]. Accordingly, a group is better served if its members have a diversity of perspectives, take equal turns talking, and have the ability to pick up on social cues [66]. In conclusion, the literature on group performance shows that dialogue, equal participation, social perceptiveness, the inclusion of diverse perspectives, and the inclusion of different modes of thinking and knowledge backgrounds are all characteristics that positively affect a group's ability to solve problems [65–67]. Working together and understanding each other is, however, not easily accomplished, and researchers within the field of group performance, i.e., collective intelligence, such as Engel, Malone, and Wooley, requested more knowledge about the interaction processes in teams [66]. Looking at the field of psychology and decision making, the winner of the 2002 Nobel Prize in Economic Sciences, the psychologist Daniel Kahneman (together with research colleague Amos Tversky) presented psychological challenges linked to human decision making under risk, which were described as cognitive biases [68]. With the concept of cognitive biases, Kahneman and Tversky challenged the idea that decisions are rational. Instead, their studies show that humans base decisions on values and an emotionally based decision making rather

than rational information, and their studies described various judgmental heuristics and the biases that they produce. Especially in situations with great uncertainties, decisions are made from an emotional point of reference, and our decision making is influenced by our beliefs and former emotional experiences, rather than by considering rational arguments [68]. The relationships among physical awareness of the body, movement, and our cognition are fundamental in Gestalt theory, a theory of perception that is the foundation of action research through the legacy of Kurt Lewin. This relationship was explored and presented in two previous papers by the action researcher [69,70].

Altogether, this literature inspired the development of meetings with characteristics of a social and relational character, involving exercises that were more playful, interactive exercises in different tempos, which activated emotions and curiosity and engaged participants in dialogue with an emotional starting point rather than a rational one, a facilitation that focused on supporting open communication, and the inclusion of different perspectives beyond the judgement of right and wrong.

2.3. Selecting and Analyzing the Data

For this study, the units of analysis were meetings. Sixteen comparable meetings with different participants were selected, and their design characteristics were classified according to the types of characteristics that were previously classified in the meeting literature [47]. The selection of 16 meetings out of a sample of 70 meetings was based on their comparability regarding context (group size, length, and challenge/aim of the meeting) and their reception of overall positive feedback from the meeting participants (their experience of the meeting). A deeper analysis of the 16 meetings was performed to extract and compare the meeting characteristics. The meetings were conducted in the early 'fuzzy' phase of planning of the built environment, where the goals were unclear and the meanings of sustainability had to be negotiated between different professional actors and roles. The 16 meetings lasted, on average 1–4 h, and they hosted between 6 and 25 participants. They all involved multidisciplinary actors from various professional disciplines that are common in early-phase meetings, such as consultants (architects, energy experts, environmental experts, IT engineers, structural engineers, systems engineers, project managers), client representatives (real estate developers, business developers, investors, municipality), and academics (mainly due to transdisciplinary practices in early phases involving academic expertise, action research, and case studies). Documentation from the 16 meetings included notes from the planning of the meetings, facilitation agendas and Powerpoint presentations, and notes from the discussions at the meetings.

In order to present a manageable amount of empirical material, three case meetings were chosen out of the 16 meetings. A table with the details of all 16 meetings is found in Supplementary Materials. The three selected cases are presented in detail as case numbers 3, 8, and 15 in Sections 3.1–3.3. The three case meetings illustrate important learning and how the main meeting characteristics were incorporated into the meetings. Two of the three cases, case 3 and case 15, have become actual best-practice lighthouse projects in terms of sustainability; case 3—Sara Culture House has pushed the limit, becoming the world's second tallest wooden hybrid construction, and it was executed with a passive-house energy standard and was built with local materials [71]. Case 15—Mariestad is one of 23 municipalities to be selected for Viable Cities program [19], which has the mission of transforming into a climate-neutral city by 2030. The Viable City program is a forerunner to the European 100 Cities net-0 carbon program. The "Mariestad climate neutral city 2030" program is based on regenerative energy, hydrogen technology, and citizen engagement. It involves the world´s first hydrogen–solar-powered gas station/tank station.

To challenge the action researcher's individual perspective, the meeting participants were asked to reflect on their experiences of the meeting design and to give suggestions for improvement. Feedback was collected as direct individual feedback at the end of the meeting or through a group dialogue or group exercise that reflected on the meeting and how it could be improved. Different methods for feedback were used depending on the

number of participants and the available time in the meeting. In some meetings, a digital inquiry was used to collect feedback at the end. Digital inquiries with anonymous feedback were mainly used in meetings with larger groups due to time limitations (about 40% of the meetings). In some cases, participant feedback was followed up with semi-structured interviews over telephone some months after the meeting (case 1—Culture House). The digital inquiries used to collect feedback were developed over time. At first, they included several questions where participants were asked to evaluate different aspects on a scale from 1 to 10 (e.g., Figure 2). Later in the action research process, the feedback inquiries had fewer and more open qualitative questions, e.g., 'describe your experience of the meeting with one word', and responses were visualized as a digital word cloud for the group to collectively reflect upon. In addition, the researcher systematically searched for informal conversation with participants that had attended meetings, either at spontaneous encounters around the coffee machine sometime after a meeting or by taking the opportunity if they met on another occasion, e.g., after another meeting where the action researcher happened to meet former participants. Such informal conversations were often very rewarding in terms of information, e.g., in the informal conversation around the coffee machine; feedback was given in a more relaxed atmosphere, and the participants then often dared to give more negative feedback and suggestions for improvements. The interplay between formal and informal communication has also been highlighted as important for collaboration between individuals of different professions [33]. These informal conversations contributed to the ongoing reflections and advanced the research and development of the meeting design characteristics.

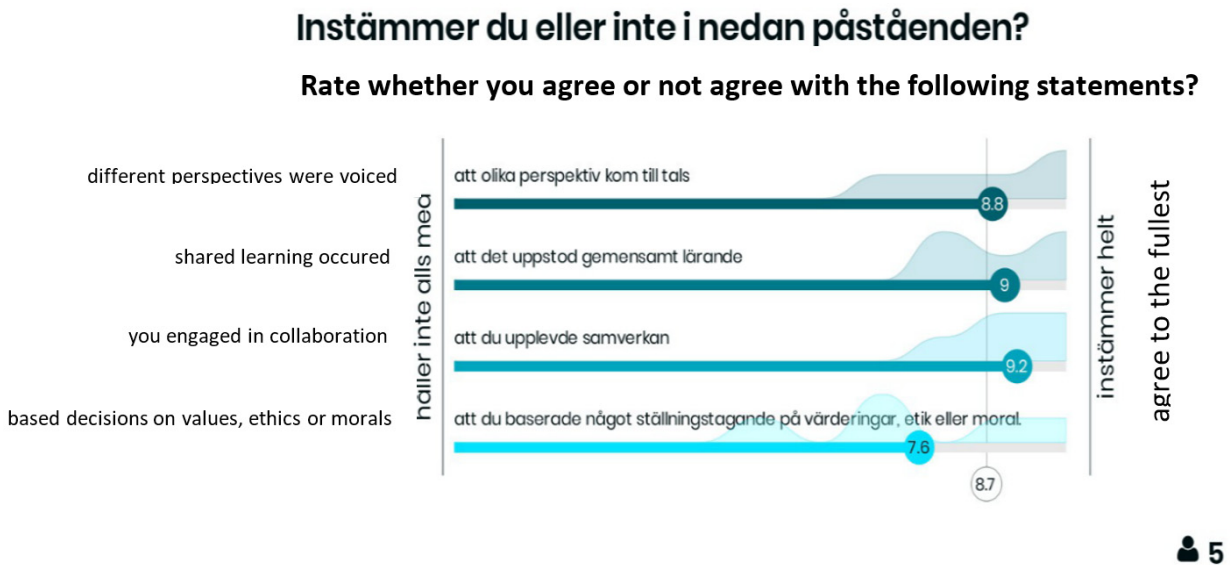

Figure 2. Example of anonymous feedback from five meeting participants using the digital inquiry (Case no. 6) on how they perceived the meeting. The ratings are on a scale from 1 to 10 according to whether they agree or not with the statements regarding the collaborative format. The answers show that they all agreed with the statements.

3. Findings

This chapter starts with a brief overview of the characteristics used in the 16 meetings (Table 1). The main findings from the cases are summarized in Section 3.3.

Table 1. This table presents the most common characteristics used in the 16 case meetings: cases 1–8 were physical 'in-person' meetings, and cases 9–16 were digital video meetings. In the table, all characteristics are identified as the *Procedural* type.

Characteristic	Type	Case
Check-in/-out Tempo change	Procedural (Temporal)	Physical: 1,3,4,5,6,7,8 Digital: 9,10,11,12,13,14,15
Individual perspectives Small-group dialogue coaching Whole-group discussion	Procedural (Sharing perspectives)	Physical: 1,2,3,4,5,6,7,8 Digital: 9,10,11,12,13,14,15,16
Introduction Presentations Summarizing conclusions	Procedural (Informative)	Physical: 1,2, 3, 4, 5, 6, 7 Digital: 9,10,11,13,14,15,16
Activating emotions Play Movement	Procedural (Physical)	Physical: 1,2,3,4,5,6,7,8 Digital: 9,11,12,13,14,15,
Half-moon seating Nice ambient room	Physical	Physical: 1,2,3,4,7,8 Digital: -

Eight meetings were physical (case 1–8) and eight meetings (case 9–16) were digital video meetings (mainly with the Teams software) [72]. The types of exercises used in the meeting designs were clustered according to the typical meeting characteristics of the three main types identified in the literature: temporal, procedural, and physical characteristics [47]. Some characteristics were commonly used in in-person physical meetings, but were more rarely used in digital-video-based meetings, as they were more difficult to achieve when participants were not gathered in one place (half-moon seating and a nice ambient room).

Temporal characteristics relate to how the meeting time is used (e.g., starting and ending on time, pre-meeting talk). The selected case meetings had a limited timeframe with an average of one and a half to four hours. The time limitation was one of the most challenging issues in terms of reaching a shared understanding that incorporated multidisciplinary perspectives. Longer meetings were often not possible, as the actors of the early phases commonly had fully booked calendars, which made it difficult to prioritize longer meetings.

Procedural characteristics direct attendees' attention and efforts toward task-oriented activities (in the literature, e.g., by using a written agenda, setting clear goals). Most characteristics identified in the study fall under this category, and are clustered in categories of: *Introduction, Check-in/-out exercises, Presentation, Sharing individual perspectives, Small-group dialogue coaching, Whole-group discussion, Activating emotions, Play, Movement, and Summarizing conclusions.* These characteristics differ from those that were previously mentioned in the literature review in terms of how they emphasize interactions between participants. Furthermore, they address other levels beyond the rational, e.g., activating emotions, playing, and moving the body across the room engage participants' physical sensations. The characteristics 'Play' and 'Activating emotions' were generally more carefully used, as they could challenge certain participants' personal comfort levels; however, they were effective in establishing a collaborative atmosphere in a short time. An example of play is depicted in Figure 3 (case no. 2); the participants were asked to think of a current sustainability challenge and to blow up a balloon to represent the size of the challenge. Standing in circles and facing each other, they coached one another on solving the problem. If the offered solution was accepted, they destroyed the balloon with a loud "Bang!" Each time the group heard a bang, they took one step to the left and got a new partner to coach their challenge. The first circle of people to solve all problems won the game. Afterwards, the group reflected on how they experienced the exercise.

Figure 3. Example of 'play' as a meeting characteristic (case no. 2) that was created to engage emotions and open spontaneous communication beyond the rational. This example shows a playful format with balloons in the form of speed dating.

Physical characteristics relate to the meeting settings and environments (e.g., appropriate venue quality, provision of refreshments) and the characteristics of the attendees. The seating and a nice room were the main characteristics identified under physical characteristics. Appropriate venue quality and provision of refreshments were mentioned in the literature; however, less was said about physical characteristics that can enable different seating arrangements or movement. Under this category, a new characteristic was used: half-moon seating. Furthermore, Table 2 shows that all physical characteristics were difficult to achieve in the digital cases. Figure 3 illustrates an exercise that captured several of the characteristics that were challenging to achieve in a digital format, such as sharing a nice room (spacious, good air quality, flexible furniture), (2) flexible seating, such as a round table or half-moon seating, (3) movement of the body across the room to engage physically, and (4) dialogue/coaching in pairs.

In Sections 3.1–3.3, cases 3, 8, and 15 are presented in more detail to illustrate important findings and how the main characteristics were used in the meetings.

3.1. Case 3: The Culture House Workshop—'Soft' Characteristics Supporting Trust and Open Communication

The Culture House workshop was an important turning point in understanding the benefits of 'soft' meeting characteristics that engaged participants in different forms of social interaction, physical movement, and activating and expressing their emotions. The Culture House workshop illustrated how such 'soft' characteristics have an impact on issues that are important for multidisciplinary collaboration, such as trust, relationships, and open communication.

Table 2. An overview of the meeting characteristics described in the three case meetings (3, 8, and 15) as informational, physical, 'hard', or 'soft'. The characteristic 'introduction' could include both information and 'soft' engaging interactions. Four of the characteristics—dialogue, coaching, movement in seating, and a nice room—were more rarely used in the digital video meetings.

Characteristics	Case 3—Physical	Case 8—Physical	Case 15—Digital
Introduction	Information/Soft	Information/Soft	Information/Soft
Presentation	Information	Information	Information
Check-in and Check-out	Soft	Hard	Soft
Individual input	Soft	Hard	Hard
Dialogue and coaching	Soft	Soft	-
Whole group talk	Soft	Hard and Soft	Soft
Movement in the room	Soft	Soft	-
Play	Soft	Soft	-
Activate emotions	Soft	Soft	Hard
Tempo change	Soft	Soft	Soft
Summarize	Information	Hard	Hard
Feedback/learning	Soft	Hard	Soft
Seating	Physical	Physical	-
Nice room	Physical	Physical	-

3.1.1. Meeting Background and Challenge

The Culture House workshop took place in 2016 at the very start of a prestigious project: a high-rise building in the north of Sweden. The expectations of creating a top-ranking project in terms of sustainability were high, but the sustainability goals were not defined. The project leader had gathered a multidisciplinary project team to secure an integrated approach; however, soon after the 'start meeting', a conflict sparked in the team regarding the sustainability goals: "*We had conflicting agendas from everywhere; the client´s, the architect´s, the company business goals, and ours as sustainability coordinators. They (the agendas) didn't match each other*". One participant described the atmosphere in the team before the case meeting: "*It was crazy, he continuously interrupted her in front of the whole project-team, pointed with the whole hand at her and said angrily—Sit down and be quiet. I was thinking of reporting it as gender harassment*". There were also issues of trust within the team and considerations regarding a lack of communication. Due to this negative situation, the project leader and the sustainability coordinator asked the researcher to facilitate a workshop with the aim of improving collaboration in the group and creating engagement for sustainability, especially with climate impact as an integrated project goal. The researcher designed the workshop after reconciling with the sustainability coordinator. The workshop was 4 h, including lunch. There were 12 participants: architects, a digital design engineer, a sustainability coordinator, structural and systems engineers, municipality representatives (client), a project leader, and a facility manager. Although some had pre-established relationships, the members of the group were new to each other.

3.1.2. Engaging in Social and Emotional Interaction

The meeting was designed as a facilitated process containing exercises for engaging participants in different forms of interaction in terms of both rational dialogues conducted in smaller and larger groups and exercises in which individuals expressed their emotions, personal values, and fears regarding sustainability issues. Playful and competitive exercises with movement were also part of the process. The focus was on supporting social interaction and strengthening relationships by expressing emotions, practicing dialogue, and listening to each other's different perspectives without judgement. During the introduction

of the meeting, the agenda was presented, together with expectations on participants' commitment to the process and acceptance of common meeting rules, e.g., open and honest communication, spontaneous sharing of answers without judgment, and daring to challenge their own personal comfort zones. The participants were also encouraged to be aware of their own physical sensations and movements of their bodies as a means of engaging with their emotional intelligence beyond the rational. An important feature for ensuring active participation on equal terms was the 'check-in' exercise that followed the introduction. In the 'half-moon seating' in which participants took turns sharing and listening to individual perspectives, the check-in served to establish open communication without judgement. Afterwards, the participants were 'activated emotionally'. First, they watched a short video with kids talking about what laws they would introduce if they ruled the world. Then, the participants were asked to 'move in the room', to place themselves on an imaginary scale, and to express what they were most afraid of; they were asked to stand on one side if they feared failing the project while aiming for a high sustainability outcome or to stand on the opposite side for fear of failing the younger generation while not trying hard enough to solve sustainability issues, such as the climate impact from construction. As the participants positioned themselves accordingly, the facilitator interviewed them ('dialogue') regarding their choice of position and how they felt. One participant became very emotional, with tears falling as she expressed her fear of failing her children in terms of not addressing sustainability enough. Then, they were asked to take a new position on the imaginary line; this time, one side represented that they felt a personal responsibility to change the construction industry's impact on climate change, and the opposite side represented that they felt that it was mainly somebody else's responsibility. Once again, they were engaged in dialogue and listened to each other's viewpoints and feelings. The facilitator was very considerate to ask questions from a point of curiosity and without judgement. The next exercise was a set of 'dialogue' exercises using small-group work with post-it notes that addressed sustainability goals. They were executed in a and competitive format to 'shift tempo' during 'dialogue' from very fast to more generous in time. The 'tempo change' in the dialogue aimed to shift between different modes of thinking—on one hand, producing fast, spontaneous, and emotionally based input, and the other hand, taking the time to discuss in smaller groups with more rationally based arguments. Engaging the two different modes of thinking (emotionally based and rationally based thinking) was inspired by Kahneman and Tversky´s research, which showed that we have two main modes of thinking, and our decisions are not always of a rational character [56]. After the work in small groups, they presented their work while standing in front of everybody (large-group dialogue in standing formation), and they also had time for questions and answers and to discuss in the large-group constellation. A voting session in a democratic format concluded the results. The process was ended with a check-out exercise, where participants reflected upon their individual experiences of the process.

3.1.3. Feedback from Participants and Results

Feedback was collected on two occasions: first during the check-out, and secondly after 6 months. In general, the participants were appreciative regarding the format and outcome of the meeting and how the meeting had supported collaboration between team members and established a shared understanding of sustainability goals. Participants commented on the collaborative exercises and how the process supported the creation of trust and commitment: "*The format raised many thoughts and created commitment*" *(structural engineer), and it was also said that:* "*our relationship with systems-engineer was not great at that time, something which changed during the workshop. My relationship with them is now based on trust, I feel they are doing what they can.*"

Feedback was also given regarding engagement and inclusion: "*I thought that everyone was engaged and 'burned for the task . . . I clearly remember how I felt that we had a common ambition and shared goals, which is not always the case . . .* " (architect). "*The workshop absolutely made a difference for the implementation of sustainability, it's important to listen to different*

experts-views, especially Systems- and Structural engineers were surprisingly engaged, maybe I have prejudice towards certain roles?" (client municipality representative). One quote shows that the workshop made the participants feel included during the workshop, as well as the following project work: "*I remember that everyone´s perspective was voiced, and it has characterized the time I worked on the project anyway . . . "* and that "*the work has been characterized by a great openness to learning . . . "* (architect). The interaction between perspectives and disciplines supported what was perceived as a more collaborate and learning climate that supported relationships in the design team. The perception was that " *. . . we learn from each other and we also developed a better relationship since it was weak before the workshop*" (digital design engineer). One participant (sustainability coordinator) reflected on the benefits of 'soft' characteristics in the workshop: "*It makes a difference when we invest in the social . . . in other projects we have also invested in relationships, playing games like throwing an ax with the client and so on . . . such activities has been rewarding; we can more easily contact each other . . . in the space between private and professional we can engage in other conversations*."

Overall, concerning the issue of integrating sustainability, the participants said that there was no common goal within the team before the workshop and that the participants had different ideas and thoughts from the beginning. One participant (client municipality representative) said that "*while someone thought building material was the most important factor, another thought energy was most important*". The major difference before and after the workshop was, according to the respondent, finding common goals together. "*Before the workshop I was a bit stressed that we would do this a whole day . . . I remember we walked around and stood in different places in the room. We did not know each other then but now it's easier to talk to each other. You get help getting started when you work this way.*"

One important insight was the creation of trust. Trust was lacking in the project prior the workshop in the Culture House project. The design of the meeting supported interpersonal interaction and created opportunities for participants to learn from each other by practicing open communication and expressing emotions. When the participants got to know each other better and when the understanding of each other's perspectives improved, trust could be developed. This built relationships during the workshop, which supported a change towards more open communication and trust between the client, the environmental specialist, the structural engineer, and the lead architect, even after the workshop.

Case 3 was also successful in terms of co-creating a sustainable design. The use of life cycle analysis (LCA) was successfully incorporated as a project requirement some time after the meeting. This later resulted in several innovative material choices and design solutions that required tight collaboration and trust between the project stakeholders. The project was recently completed and opened to the public and is considered an architectural demonstration project that pushed the best practices for wooden high-rise architecture in Sweden and the world [71].

3.2. Case 8: The 'Making Sense' Workshop—Digital Tools Supporting Group Processes (GSS)

Case 8 was an important turning point in understanding the benefits of a meeting designed as a process using 'hard' digital tools [72] in combination with exercises engaging participants in social interaction. Using such digital tools was especially positive for larger groups, as time limitations commonly prevented individual input.

3.2.1. Meeting Background and Challenge

Case 8 also took place in 2016. The researcher was asked to facilitate a session that was part of a whole-day international transdisciplinary seminar— 'Making Sense'. The name of the seminar stems from the notion of 'sensemaking' within the architectural discourse. The session was one hour at the end of a full day with lectures and seminars on computer-driven design in sustainable planning (i.e., computational or regenerative design). The researcher designed the workshop after reconciling with the host of the seminar, a colleague at the architectural firm, but from a different branch (computational design). There were approximately 35 participants, consisting of architects, engineers, and researchers, who

were mainly from Europe and were active in early design practice. The participants came from different cultures and had to speak English, which was not the first language for most of them. The aim for the one-hour workshop was to create a dialogue for shared learning on collaborative practices within computational design. Most participants had not been introduced to each other, and there were very few pre-established relationships, which was challenging in terms of establishing an open and trustworthy climate. The short timeframe of 1 h and the large group size made individual expression challenging to achieve.

3.2.2. Meeting Design and Results

This meeting built on previous experiences with a meeting designed as a facilitated process, starting with the *introduction* (to establish common meeting behaviors and to get acceptance for the aim and format of the meeting) and continuing to engage participants in different interactive exercises and formats of dialogue. However, for this meeting, a new characteristic was introduced. Inspired by the literature on technology designed to enhance the communication and decision making of groups, i.e., group support system tools [44], a web-based tool was used in the meeting. Differently from the research in the previous literature, which used stationary computers, this tool was easily accessible through each participant's smartphone. The meeting started with a short *introduction* presenting the purpose of the meeting and the agenda with playful exercises, as well as the reasons for why participants were asked to engage in social interaction. The participants were asked to position themselves in the room according to how they felt regarding different statements posed by the facilitator. They were then asked to engage in dialogue, reflecting on their choices, with the people standing next to them. With the use of the digital tool, all participants' individual input was collected, processed, and visualized in real time with a projection on a large screen. In just a matter of seconds, 36 individual reflections were collected, processed, and displayed in an easy-to-read word cloud that showed time as the main obstacle for collaboration. With the use of the tool and a simple projector, the meeting participants could answer and reflect together in real time on the group's aggregated individual answers, as they were projected on a large screen in real time. This activity created a "wow" effect, as this type of group support system tool was new at the time. The participants continued individually, anonymously answered more questions, and reflect on the results of the aggregated group answers. Figure 4 shows 36 individual anonymous answers that were instantly displayed on a large screen. The possibility of harvesting individual answers regardless of group size was very time efficient. Using the new tool provided new insight into how digital tools can support large-group processes in a time-efficient manner. The tool offered a display in word clouds, staple diagrams, and color-code fractions in real time. At this time (2016), instant computational processing of individual perspectives was a new practice in Sweden and created some surprise. The use of the tool spread rapidly in the architectural practice; within a year, there were 40 registered users at the architectural office alone. The practice also spread outside the office as different actors started using the tool. Today, this tool and similar tools have become common practice in the planning sector in Sweden. However, in continuing to use digital tools at action research meetings, there was also occasional feedback that digital tools could have social drawbacks in terms of cultivating relationships, the flow of energy, and the creative atmosphere in the room.

As a result of the action research meetings, the use of the GSS tool also grew in popularity amongst other colleagues at the architectural firm at which the action researcher was working. In just four months, more than 40 practitioners had subscribed to license the tool. During the course of the study, the use of the tool spread in forums outside the architectural office.

Figure 4. Screenshot from the GSS tool: 36 individual and anonymous answers regarding the question 'What keeps us from collaborating more?' were collected and immediately projected on a screen based on the answers of a large group in a time-effective manner.

3.3. Case 15: 'Fågel Fenix' Meeting—A Sudden Shift of Practice to Adapt to Digital Video Meetings

This case illustrates a sudden change in practice towards digital video meetings. Due to the COVID-19 restrictions, new applications and behaviors were introduced and executed at a fast pace. New meeting characteristics were applied and tried out at a fast pace to adjust to the new circumstances, as early-phase meetings had to use digital video conference tools as meeting arenas, e.g., Zoom, Teams, GoToWebinar, and Skype. New free web-based software was also introduced as a group support system (GSS tools) [44], e.g., Mentimeter, Ideaboardz, and Mural [72].

3.3.1. Meeting Background and Challenge

During the first months of the COVID-19 pandemic in the spring of 2020, a series of 90 min collaborative multidisciplinary meetings were executed to avoid the risk of passivity and to initiate cross-organizational collaboration for a sustainable built environment. The initiative was called '*Fågel Fenix* (the Phoenix bird)—*from crisis to sustainable development*' and the aim of the initiative was to engage stakeholders in collaborative dialogue on how to use the COVID-19 crisis as a mechanism for change in order to increase sustainability. The researcher designed the format of the meetings; some were facilitated by the researcher and others by other colleagues at the firm using the same meeting format. The meeting in focus was facilitated by the researcher and had twelve participants from different sectors: the municipality, citizens, university, business, and industry. Some were familiar, but half of the group was new to each other. What was unusual was the high level of the professional roles that were present, such as the municipal director, representatives from the Swedish government office, and top-notch consultant specialists. The professionals present were highly relevant to the task of the meeting. Their participation (considering their fully booked calendars) was possible due to the easy-to-access digital video format and the reduction of travel time. The meeting was 1.5 h in the Zoom video conference tool. The aim of the meeting was to spark collaboration by co-creating a roadmap for a zero-emission municipality by 2030. This was a challenging aim for several reasons: first, the lack of previously established relationships and trust between participants; the introduction of a new technique by using a new digital video format; the meeting task of co-creating a

zero-emission society; finally, the short timeframe of the meeting (90 min). When facilitating the first all-digital workshop, the first-person researcher felt a lot of insecurities, mostly due to the dependency on technology, which could easily cause disturbance with issues beyond the facilitator's control. This was also partly due to the lack of normative meeting behaviors during video meetings (i.e., should always the video be on?). The video meeting format was also challenging, firstly, due to the lack of physical movement—sitting still too long could have a negative impact on some participants—and, secondly, as the video format lowered the ability for social perceptiveness—reading each other's facial and bodily expressions.

3.3.2. Meeting Design and Results

The meeting was designed to quickly establish a collaborative and open atmosphere. The *introduction* included the aim and rules of conduct, such as having the video on, using the chat function, digitally raising one's hand, and handling breakout rooms. As in most collaborative meetings, it started with a 'check-in' exercise to practice open democratic communication, where the participants had a few seconds to reflect and then share a current challenge that they were facing. Everybody participated with spontaneous sharing and listened to each other, and they were encouraged to be curious and without judgement. The open vulnerability of sharing a current challenge seemed to evoke empathy and sparked interesting reflections in the group beyond the rational. In dialogue, the participants spontaneously added to each other's input. Afterwards, a video was shown to evoke emotions, followed by a facilitated group reflection. A link to a webpage (group support system/GSS-tool) was shared, where participants could use digital post-its. Warmed up by the previous open discussion, the group produced 30 individual post-it ideas in just two minutes. This was very time efficient, as there was direct documentation without losses in the transcription of individual and anonymous perspectives, which were visible to everyone in real time. The participants also voted on their favorite digital post-its by pressing a button using the same tool. After a few minutes of group work, the facilitator read the post-its out loud, which became like a roadmap in a storytelling format. They concluded the session with a group reflection regarding the roadmap story that they had co-created, as well as their individual experiences with the meeting design.

The closing of the process—the check-out exercise around the table with individual reflections regarding the meeting process—resulted in a high level of satisfaction and appreciation for the concrete results that the meeting had produced, i.e., the production of a roadmap for the transformation towards a fossil-free municipality; the municipal politician stated: "*The process brings positive thoughts for me, a sense of moving forward, how we can get started, even though we had technical challenges (the video application), but is fun working with you. We now have visions- and marketing ideas.*" The academic researcher claimed: "*Me too, I feel that we have a sharp case, I like it! It´s tangible, then it becomes pleasurable to work with, we know now how to bring it concretely forward, thinking about the economy but also the whole that we brought with us from the start, the success lies in the whole*." The project management consultant stated: "*The process was open and good, more straight on to the core of the topic, the dialogue was relevant to the topic. I attend many meetings where you never get there. It´s difficult in a short meeting where much must be discussed. Usually, one has to meet several times and reflect in between to get here (to the core)*. "The energy consultant claimed: "*I'm an experienced workshop facilitator, so for me this is a 'typical meeting', but the difference is that you as a moderator, you are sharper on issues that are helpful in moving us forward*." The municipal official stated: "*It was a good thing that you stop my rambling, it made me think about myself. I have sat in business meetings where people go on and on about private things.*" The action researcher asked: "Can I always interrupt in that case do you think?" The municipality official said: "*Some might become a little so, so. But we have limited time, and everyone gets a piece of it. You refer to the schedule and everyone gets their share. It builds cohesion of teams and a structure. The whole way, the approach you have, you asked us* (in the beginning) *to accept you as the moderator, I have never been asked that before in a single meeting, you asked us to trust the process and you said: I will limit you if you float out. By that you get acceptance there* (for interrupting her)."

A few days after the meeting, one of the participants from the municipality phoned the action researcher regarding another issue and was asked to share some spontaneous feedback on his experience in the meeting: "*You did well, maybe you can get more out with fewer participants, but it was a good mix, so I don´t know because it was also good to hear everyone. In physical meeting, we have more contact. In a physical meeting with 17 people, then some sit quietly for better or worse, in the digital meeting the same behavior is rude. In the meeting, everyone got their round to speak, but such a meeting takes longer, to get everyone talking about the same thing, and reach consensus? It was an interesting discussion (in the meeting), worth following up on and we went from what Mariestad should do, towards what we could be doing together. Now we did lay a foundation of a future-proof vision: it is not just hydrogen (fossil-free energy), it was clear that more is needed. Hydrogen is the only one (technique) that carries energy as versatile as the fossil energy, BUT it needs a society that works differently.*" One week after the meeting, another participant, the head of the municipality, also rang the action researcher and asked for a tender offering to follow up with a second meeting, thus creating a more formalized collaboration between the meeting's participators. The head of municipality said: "*It was interesting to hear other people's perspectives, and the mix of participants was very exciting. How can we capture this potential in the next step? It was the first time I did the digital post-it notes at the end of the meeting (the GSS-tool) as means to share our common thoughts, and individual (input) on how (we can achieve the goal), the continuation and the next step (what to do). The next question is how 'you' become a 'we'! We experienced different ideas and thoughts that can develop our community. We like to see that we become one 'we' to create these conditions. We believe that those who were at the meeting plus a few more, could benefit from becoming a 'we', hang on to us in the hydrogen development (of our municipality). How can we do it in a formalized way? Would like to see a letter of intention, where we write together a common goal, ambition, resources, seek common development money.*"

The feedback provided the insight that meetings in digital video format have other challenges than those of physical meetings; they are limiting in terms of interaction, seating, movement, and dynamic dialogue. However, it also provided opportunities to introduce new digital tools that could process participants' input in new ways. Furthermore, participants that were normally difficult to attract to attend meetings due to their busy calendars were able to join due to the easy-to-access digital video format.

With respect to sustainable outcomes, case 15 has become a lighthouse project for climate-neutral city transformation. The participants successfully reached a shared understanding of sustainability; in a very time-efficient manner (90 min), they co-created a roadmap for a net-zero carbon transformation based on hydrogen and regenerative energy. Before the meeting, the participants hardly knew each other. The meeting resulted in the initiation of further engagement, and a multidisciplinary collaboration was formally established to develop a roadmap for a climate-neutral city by 2030. Some months later, a local political commitment for 'climate-neutral transformation by 2030 was signed. Within a few months, an application for governmental funds (Viable Cities) [19] was co-created by the participants, and funds were successfully granted in September 2021 in competition with other municipalities in Sweden. It was one of 23 municipalities to be selected for the Viable Cities program [19] with the mission of achieving a net-zero carbon transformation based on hydrogen technology, regenerative energy, and citizen engagement. The municipality has the world´s first hydrogen–solar-powered gas station/tank station.

4. Discussion

This paper presents findings regarding the meeting design characteristics of 16 collaborative meetings in the early 'fuzzy' phase of planning in architectural practice. This action research contributes to the development of sustainable architectural practice; however, is also applicable for other professionals who facilitate meetings that address sustainability in the early phases of planning. As an action research project, it is part of a shift towards more multidisciplinary collaboration in pursuit of sustainable development [20], and the activities of the action research contributed to the spread of such an experience amongst

colleagues in the office. This research helped to develop methods that companies can use to broaden architectural offices' business models for collaborative work—firstly, with meeting design guides for architectural work, e.g., the digital roundtable format in case 15, and secondly, the internal discourse about sustainability was infused with collaborative meetings. This action research contributed to the companies' own shared understanding of sustainability, as both companies set their own climate goals during the period. Cases 3 and 15 illustrate the initial meetings in the projects that later received national recognition in terms of sustainability: case 3 as a cutting-edge high-rise building with low climate impact [71], and case 15 as one out of 20 municipalities selected to receive national support to become climate neutral by 2030 [17]. As an academic contribution, this study adds to the research on the sustainability of the built environment, and the central question is how meetings can be designed to support a shared understanding of sustainability by integrating multidisciplinary perspectives and by identifying meeting design characteristics. Meeting research has highlighted the importance of meetings in everyday organizational work and the need for further development of the design of meetings [44–46]. This study contributes to meeting research by supporting previous research, as well as by contributing with new insights. First, this study supports previous research on certain meetings' characteristics being important in participants' perception of an effective meeting, such as inviting the right attendees, distributing an agenda, and setting clear goals [47]. In addition to this, this study introduced new meeting design characteristics (Table 2), especially procedural characteristics that engage participants in different interactive exercises that support multidisciplinary perspectives and the co-creation of a shared understanding of sustainability. This adds new perspectives to the body of literature on meeting research, especially in terms of procedural characteristics [47]. Procedural meeting characteristics such as *introduction*, *check-in,* and *check-out* exercises that emphasize behavioral rules and participants' active participation have not yet been reported. Furthermore, this study contributes to meeting research by enriching meeting design with new meeting design characteristics, i.e., 'soft' and 'hard'.

The 'hard' characteristics introduced supportive ways of using digital GSS tools in meetings [54]. Firstly, the video format enabled the right participants to attend the meeting [47], and secondly, especially in the large-group meetings [44], the sharing of individual perspectives influenced how participants perceived meeting effectiveness. During the study, technical functions were developed for the GSS tools, e.g., small-group rooms, which made small-group dialogues easier to achieve in the digital meeting format. The 'soft' characteristics introduced exercises in which participants were engaged in social activities for building relationships, trust, and open communication across disciplines. These issues—trust [31,34], relationships [35], and open communication [30,32,33]—have been identified in research on collaboration in construction to be important in terms of creating a collaborative atmosphere among multidisciplinary participants. Although collaboration between multidisciplinary actors is fundamental for delivering sustainable construction, e.g., [9,11,23,35], there is a gap in both construction management research and the general meeting literature in terms of how to achieve that during meetings. The meeting characteristics in this study supported decisive factors for collaboration among multidisciplinary actors in early-phase meetings. On one hand, 'soft' characteristics, such as '*play*', '*movement*', and '*activating emotions*', were very time efficient in terms of establishing relationships and open communication, but such characteristics were more difficult to achieve in the digital format. Therefore, they were more carefully used in both physical meetings and in the digital video meeting format (see Table 1). In cases where the group's collaborative maturity allowed the inclusion of 'soft', playful, and emotionally engaging characteristics in the meeting (example Figure 2), this often resulted in positive feedback; the meeting was experienced as surprisingly creative and engaging. In the optimal meeting design, the facilitator delicately balanced the meeting process and the participants in a creative but secure space.

The main findings in this study are exemplified with three case meetings, which illustrate how meetings can be designed in support of collaborative practices to create a shared understanding of sustainability. In the following subsections, the meeting characteristics of the three cases are discussed in more depth.

4.1. Discussion of Case 3—The 'Culture House' Meeting

The results from case 3, the Culture House, illustrate the benefits of designing meetings with 'soft' characteristics—exercises that engage in social activity, instead of just engaging in conversation with rational arguments. The participants' feedback from case 3 showed how trust, relationships, and interdisciplinary communication were improved during and after the meeting. The 'soft' characteristics included different forms of social interaction, tempo changes in dialogue, shifting between individual, small-group, and large-group reflection, activating emotional triggers, moving the body across the room in a playful mode, focusing on sensing one's body, and expressing individual emotions.

The development of 'soft' characteristics was inspired by research in social psychology and pedagogy, which highlights, on one hand, the importance of dialogue as fundamental to the ability to think and perform together collectively [64] and, on the other, emotions as an important driver in decision making [68]. The findings in this paper indicate that meeting processes with 'soft' characteristics support trust, open communication, and building relationships between multidisciplinary actors. The following have previously been identified as important for collaboration in construction: trust [32,33], creating shared frameworks and learning [6], balancing power struggles [34], and building relationships between different professional roles [35]. Furthermore, in case 3, the participants experienced that interdisciplinary and interprofessional engagement and communication improved during and after the workshop, and the design team was able to combine competences and different professionals' perspectives to the benefit of a shared understanding of sustainability throughout the continued process, i.e., the project they were engaged in together. This is in line with the previous literature on collaboration in construction, which emphasizes interprofessional engagement and communication as important aspects for achieving collaboration for sustainability [5]. The findings also provide a pragmatic result with respect to the request for more research on collaborative project relationships, e.g., [35]. Case 3 pushed design limitations and became the world´s second tallest hybrid wooden construction with a passive energy standard, and it was built with local materials.

4.2. Discussion of Case 8—The 'Making Sense' Meeting

Case 8, the 'Making Sense' meeting, broke new ground in terms of how GSS tools [54,72], which are easily accessible through smartphones, support the effectiveness of large-group meetings that are constricted by time limitations. The case illustrates how a GSS tool can support the integration of different perspectives in a time-efficient and non-hierarchical manner by displaying anonymous input on large screens and organizing them in diagrams and word clouds. Previous meeting research discussed group size as a factor that impacts meetings' perceived effectiveness; large-group meetings are often perceived as less efficient [44,45] in making use of all participants' individual perspectives [51] within a limited timeframe [52]; thus, a smaller group size is seen as favorable for meeting quality [44,45]. Through the introduction of a new digital GSS tool, this was, however, made possible. By using a digital GSS tool, individual input can be harvested and processed in real time, e.g., clusters of individual choices can be processed by a software and presented in staple diagrams or word clouds. With the use of a projector, the aggregated results can be presented instantly on a large screen for the group to consider. As the GSS tools used in the meetings were easily accessible through the participants' smartphones (and computers), they reduced the technical barrier that was highlighted in previous research and experiments that used stationary GSS tools that forced the participants to sit in a fixed position behind a computer screen with a somewhat complicated software [54]. However, face-to-face interaction was favorable for establishing relationships, especially considering

that people have different maturities regarding the use of technology. Using new GSS tools in meetings provided new ways of engaging large groups in 'collective thinking' [64,65] and increased the sharing of multiple perspectives [5,6] to build a shared understanding and alignment of interests [30]. Using GSS tools to process data in real time provided new forms of interaction in meetings. This finding adds new perspective to previous meeting research and the challenges of sharing individual perspectives in large-group meetings [51] and coordinating time efficiently [52]. However, differences in technical maturity amongst the participants must be considered.

Since the meeting, the use of GSS tools and other digital inquiry tools in meetings [72] has become close to a standard in multidisciplinary meetings within the early 'fuzzy' phases of professional planning in Sweden. Looking at the findings and their implications in the broadest context, digital tools in combination with human interaction of a social, emotional, and relational character are especially interesting for future studies as means to achieve 'collaborative intelligence' [56] between computational powers (artificial intelligence) and human abilities on the group level. Future research directions should explore this area in experimental ways.

4.3. Discussion of Case 15—'Fågel Fenix Meeting'

The key findings from case 15—'Fågel Fenix meeting' capture a major change in practice towards digital-video-based meetings and new usages of digital tools. Due to the restrictions of the COVID-19 pandemic in March 2020 in Sweden, the meeting format shifted within a couple of weeks. In early-phase architectural practice, the response to the pandemic restrictions was a sudden and increased usage of 'hard' characteristics (digital GSS tools) [54,71]. This provided new challenges and opportunities. Digital video meetings were not new as such; however, they had never become the norm. Due to the COVID-19 restrictions, the new behaviors were necessary and, therefore, accepted by all; hence, video meetings quickly became the new norm. The sudden shift towards meetings conducted in video format had both positive and negative effects on their perceived effectiveness. One major positive effect was the availability of relevant actors in joining meetings. Meeting research has highlighted the importance of having the relevant actors and competences participating in the meeting [45,47]. Case 15 illustrates how relevant participants, who are normally very difficult to attract to a meeting in the very early phases of planning, were able to join the meeting, as they were not restricted by geographical distance. The digital video format also had challenges. In particular, the level of social and physical interaction was more difficult. The screen inhibited social perceptiveness, which is an important factor for a group's ability to solve problems together [55]. As shown by the feedback from case 15, the inclusion of 'soft' characteristics in support of collaboration, the strengthening of relationships [35], and open communication [32,33] were still possible in the digital video format, but they required more active facilitation during dialogue and more creative ways of designing exercises, such as by introducing new GSS tools, e.g., the digital post-its. Another challenge experienced in case 15 was the technical barrier of learning how to use new digital tools. Overall, the digital video format required more thorough preparation and facilitation, and it both restricted certain characteristics (social perception and physical interaction) and offered possibilities for new types of exchange between participants (chat function, turning the camera on/off). Case 15 became a lighthouse project in terms of climate-neutral urban planning by 2030; it was one of 23 municipalities to be selected for the Viable Cities program [19], with the mission of achieving a net-zero carbon transformation based on hydrogen technology, regenerative energy, and citizen engagement, and it has the world´s first hydrogen–solar-powered gas station/tank station.

4.4. Limitations and Future Research

The study has some limitations. The study was undertaken between 2015 and 2020 in Sweden in an architectural practice by one facilitator, which limits the possibilities for the generalization of the results. Although the empirical context is extensive (notes, interview

transcripts, documents, feedback reports, etc. from 70 workshops) and provides in-depth knowledge in terms of an insider perspective, still, all meetings were designed, tested, and facilitated by the same architect and in the same national, organizational, and industrial context. Additional research is needed in other contexts for comparisons. The practice-based insider approach had strengths and weaknesses. It provided in-depth understanding; however, the findings need to be tested by others for verification and further development. There is also a challenge in the sense that theories from different epistemological traditions—for example, meeting research, construction management, and concepts drawn from social psychology and pedagogy—were used and combined to inspire the development of this action research.

From an action research perspective, looking at the change in architectural practice in Sweden, in just a few months, the use of video conference tools for meetings rapidly developed. The transformational force and the speed of implementing new behaviors and techniques were swift and had little resistance. Existing video conference tools also adapted to participants' needs for interacting, being able to view each other, and meeting in smaller groups. In a wider sense, participants and organizations in the building sector in Sweden structured their software to embrace this rapid behavioral change towards a digital meeting practice. It is too early to determine whether the change in meeting format toward digital video meetings is here to stay in the long run. However, this action research study captured a shared collective experience and a change in behavior that transcended sectors and national borders. This collective and all-inclusive phenomenon is interesting for further research, especially in the light of the global climate crisis and the need to rapidly transform towards a sustainable built environment.

5. Conclusions

This study contributes to the field of research on sustainable built environments with a focus on meeting designs that support a shared understanding of sustainability by integrating multidisciplinary perspectives in the early phases of planning. This paper presents findings from action research based on experiences from 16 comparative meetings in the early 'fuzzy' phase of planning, which were analyzed through the lens of meeting design characteristics [47]. The meetings were selected from the empirical context of the action researcher´s insider perspective of designing and facilitating 70 collaborative meetings with multidisciplinary participants during the initial early phases in architectural practice. The action research methodology has the overall aim of changing practice by engaging with practice. The cases provide insights into the early-phase processes in which the building industry can achieve considerate and sustainable impacts on the built environment. This was exemplified by two cases becoming lighthouse projects in terms of sustainability: case 3 as the world´s second tallest wooden construction [71] and case 15 as one of the first cities transforming towards carbon neutrality based on hydrogen and renewable energy. This insider action research contributed and captured a change towards multidisciplinary collaborative meeting practice in early phases at two architectural firms in which the researcher worked during the study. The findings are also applicable to other professionals who facilitate meetings in the early phases of planning. This study contributes to meeting research, as well as to the practical design of meetings, with a set of new 'hard and soft' meeting characteristics to be used in the design of multidisciplinary meetings that address sustainability. The findings present procedural characteristics that are new to previous meeting research: 'soft' characteristics, which engaged participants in interactions of a social and emotional character, and 'hard' characteristics, which had an emphasis on technical/digital group support system tools (GSS tools) [54,72] that were used in new ways, especially for larger groups. The participants' feedback showed positive effect on the support for trust and relationships within the team and the understanding of different perspectives during and after a meeting. The 'soft' characteristics included: (1) different forms of interaction rather than topics of discussion; (2) check-in and check-out exercises to mark the beginning and end of a meeting process; (3) different dialogue exercises in

smaller or larger groups conducted in different tempos; (4) sensing emotions in the body, expressing them, and engaging in play; (5) moving and positioning oneself in the room to express a point of view. New 'hard' meeting characteristics were identified as digital group support system tools, enabling new meeting formats (video meetings), and informing participants in new ways (computer processed in-data). This had implications especially for meetings with larger groups, who benefited from processing individual answers in a time-efficient manner.

Looking at change in practice during the action research, this study also exemplifies how new practices were developed at a fast pace in Sweden due to the COVID-19 pandemic. The sudden change towards meetings conducted in a digital video format instead of normative physical meetings had both positive and negative impacts on meetings' perceived effectiveness. Overall, the new digital video format enabled the participation of relevant actors and competences; however, it restricted social perceptiveness and interaction in the room. This study illustrates new practices for co-creating a shared understanding of sustainability that challenges normative meeting behaviors: on one hand, 'soft' characteristics that engage participants in social interaction and, on the other hand, 'hard' digital tools for sharing a diversity of individual perspectives in a time-efficient manner.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/su14063159/s1, Supplementary File: List of 16 meetings.

Author Contributions: E.G.: conceptualization; methodology; investigation; analysis; writing: original draft, review, and editing. P.F.: supervision; review, editing, and writing. All authors have read and agreed to the published version of the manuscript.

Funding: The study has received financial support/scholarship for industrial doctoral studies from the GGF Foundation (c/o IMT Financial Advisors AG, Austrasse 56, 9490 Vaduz).

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to their containing information that could compromise the privacy of research participants.

Acknowledgments: We wish to thank all participants in the meetings referred to in this study and their valuable feedback on the test of meeting characteristics. Thanks goes to the fellow doctoral students at the Royal Institute of Technology, Department of Real Estate and Construction Management, who provided feedback on an earlier draft in several seminars.

Conflicts of Interest: The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

References

1. Paris Agreement. Available online: https://unfccc.int/sites/default/files/english_paris_agreement.pdf (accessed on 10 February 2022).
2. Agenda 2030. Available online: https://sdgs.un.org/goals (accessed on 30 August 2021).
3. Klein, J.T. The discourse of transdisciplinarity: An expanding global field. In *Transdisciplinarity: Joint Problem Solving among Science, Technology, and Society*; Birkhäuser: Basel, Switzerland, 2001; pp. 35–44.
4. Sehested, K. Cross-sector partnerships as a new form of local governance. In *Local Partnerships in Europe: An Action Research Project*; Kjaer, L., Ed.; The Copenhagen Centre: Copenhagen, Denmark, 2003.
5. Keys, Y.; Silverman, S.R.; Evans, J. Identification of Tools and Techniques to Enhance Interdisciplinary Collaboration during Design and Construction Projects. *Health Environ. Res. Des. J.* **2016**, *10*, 1–11. [CrossRef]
6. Pennington, D. Cross-disciplinary collaboration and learning. *Ecol. Soc.* **2008**, *13*, 8. [CrossRef]
7. Hekkert, M.P.; Janssen, M.; Wesseling, J.H.; Negro, S.O. Mission-oriented innovation systems. *Environ. Innov. Soc. Transit.* **2020**, *34*, 76–79. [CrossRef]
8. Shelbourn, M.; Bouchlaghem, N.; Anumba, C.; Carrillo, P. Planning and implementation of effective collaboration in construction projects. *Constr. Innov.* **2007**, *7*, 357–377. [CrossRef]

9. Ding, G.K.C. Sustainable construction–The role of environmental assessment tools. *J. Environ. Manag.* **2006**, *86*, 451–464. [CrossRef]
10. Sanders, E.; Stappers, P.J. Co-creation and the new landscapes of design. *CoDesign* **2008**, *4*, 5–18. [CrossRef]
11. Ranhagen, U.; Groth, K. *The Symbiocity Approach, a Conceptual Framework for Sustainable Urban Development*; SKL International: Stockholm, Sweden, 2012; p. 67.
12. Lowton, R.M. *Construction and the Natural Environment*; Butterworth Heinemann: Oxford, UK, 1997.
13. Nilsson, F.; Hensel, M.U. *The Changing Shape of Practice*, 1st ed.; Routledge: London, UK, 2016.
14. The Royal Seaport NDS. Available online: https://vaxer.stockholm/omraden/norra-djurgardsstaden/vart-satt-att-arbeta (accessed on 30 August 2021).
15. Södetörnsmodellen. Available online: http://sodertornsmodellen.com/medskapande-2-2 (accessed on 30 August 2021).
16. LMF30. Available online: https://lfm30.se/mal-strategier (accessed on 30 August 2021).
17. Stadsutvecklingszoner. Available online: https://malmo.se/Stadsutveckling/For-dig-som-bygger-och-utvecklar/Styrning-och-strategier/Stadsutvecklingszoner.html (accessed on 30 August 2021).
18. Mistra Carbon Exit. Available online: www.mistracarbonexit.se (accessed on 30 August 2021).
19. Viable Cities. Available online: https://en/viablecities.se/klimatkontrakt-2030 (accessed on 30 August 2021).
20. Trencher, G.P.; Yarime, M.; Kharrazi, A. Co-creating sustainability: Cross-sector university collaborations for driving sustainable urban transformations. *J. Clean. Prod.* **2013**, *50*, 40–55. [CrossRef]
21. Trencher, G.; Bai, X.; Evans, J.; McCormick, K.; Yarime, M. University partnerships for co-designing and co-producing urban sustainability. *Glob. Environ. Change* **2014**, *28*, 153–165. [CrossRef]
22. Trencher, G.; Geissler, A.; Marvin, S.; Bulkeley, H.; Mai, Q.; McCormick, K. 15 years and still living: The Basel pilot region laboratory and Switzerland's pursuit of a 2,000-watt society. In *Urban Living Labs*; Routledge: London, UK, 2018; pp. 167–188.
23. Charnley, F.; Lemon, M.; Evans, S. Exploring the process of whole system design. *Des. Stud.* **2011**, *32*, 156–179. [CrossRef]
24. Design Dialogen. Available online: https://www.chalmers.se/SiteCollectionDocuments/Centrum/CVA%20Centrum%20f%C3%B6r%20V%C3%A5rdens%20Arkitektur/temadagar-och-workshops/dialog-2017/Designdrivna%20dialoger.pdf (accessed on 30 August 2021).
25. Fröst, P. *Designdialoger i Tidiga Skeden. Arbetssätt och Verktyg för Kundengagerad Arbetsplatsutformning*; CTH, Architecture: Gothenburg, Sweden, 2004.
26. Fröst, P.; Elf, M.; Lindahl, G.; Wijk, H. Shared decision making in designing new healthcare environments–Time tobegin improving quality. *BMC Health Serv. Res.* **2015**, *15*, 114.
27. Fröst, P.; Gustafsson, A.; Eriksson, J.; Lindahl, G. *Designdrivna Dialoger för Arkitektur och Samhällsbyggnad*; SWECO FFNS and Centrum för Vårdens Arkitektur, Chalmers University of Technology: Gothenburg, Sweden, 2017.
28. Eriksson, J.; Fröst, P.; Ryd, P. Mapping a framework for co-design in healthcare buildings-an empirical study. In *ARCH12*; Chalmers University of Technology: Gothenburg, Sweden, 2012.
29. Lindsey, G.; Todd, J.A.; Hayter, S.J.; Ellis, P.G. *A Handbook for Planning and Conducting Charrettes for High-Performance Projects*, 2nd ed.; National Renewable Energy Laboratory: Golden, CO, USA, 2009. Available online: http://www.nrel.gov/ (accessed on 30 August 2021).
30. Lahdenperä, P. Making sense of the multi-party contractual arrangements of project partnering, project alliancing and integrated project delivery. *Constr. Manag. Econ.* **2012**, *30*, 57–79. [CrossRef]
31. Ruijter, H.; van Marrewijk, A.; Veenswijk, M.; Merkus, S. 'Filling the mattress': Trust development in the governance of infrastructure megaprojects. *Int. J. Proj. Manag.* **2020**, *39*, 351–364. [CrossRef]
32. Emmitt, S.; Gorse, C. *Communication in Construction Teams*; Taylor & Francis: Abingdon, UK, 2007.
33. Dainty, A.; Moore, D.; Murray, M. *Communication in Construction: Theory and Practice*; Taylor & Francis: Abingdon, UK, 2006.
34. Christine, R.; Löwstedt, M. Stakes and struggles in liminal spaces: Construction practitioners interacting with management-consultants. *Eng. Proj. Organ. J.* **2014**, *4*, 123–133.
35. Memon, S.A.; Rowlinson, S.; Sunindijo, R.Y.; Zahoor, H. Collaborative Behavior in Relational Contracting Projects in Hong Kong—A Contractor's Perspective. *Sustainability* **2021**, *13*, 5375. [CrossRef]
36. Thomson, C.S.; El-Haram, M.A.; Rohinton, E. Mapping sustainability assessment with the project life cycle. *Proc. Inst. Civ. Eng. Eng. Sustain.* **2011**, *164*, 143–157.
37. Schwartzman, H.B. The meeting as a neglected social form in organizational studies. *Res. Organ. Behav.* **1986**, *8*, 233–258.
38. Kozlowski, S.W.J.; Ilgen, D.R. Enhancing the effectiveness of work groups and teams. *Psychol. Sci. Public Interest* **2006**, *7*, 77–124. [CrossRef]
39. Allen, J.A.; Lehmann-Willenbrock, N.; Rogelberg, S.G. *The Cambridge Handbook of Meeting Science*; Cambridge University Press: New York, NY, USA, 2015.
40. Bagire, V.; Byarugaba, J.; Kyogabiirwe, J. Organizational meetings: Management and benefits. *J. Manag. Dev.* **2015**, *34*, 960–972. [CrossRef]
41. McManus, K. Stop Meeting Madness! How to Make Meetings Lean. In Proceedings of the 13th International Scientific Conference INPROFORUM, Nashville, TN, USA, 19 May 2007–23 May 2007; p. 1.
42. Mosvick, R.K.; Nelson, R.B. *We've Got to Stop Meeting like This! A Guide to Successful Business Meeting Management*; Scott Foresman: Glenview, IL, USA, 1987.

43. Rogelberg, S.G.; Shanock, L.R.; Scott, C.W. Wasted time and money in meetings: Increasing return on investment. *Small Group Res.* **2012**, *43*, 236–245. [CrossRef]
44. Allen, J.A.; Tong, J.; Landowski, N. Meeting effectiveness and task performance: Meeting size matters. *J. Manag. Dev.* **2020**, *40*, 339–351. [CrossRef]
45. Litsikas, M. Overcome team problems. *Quality* **1995**, *34*, 26–28.
46. Leach, D.J.; Rogelberg, S.G.; Warr, P.B.; Burnfield, J.L. Perceived meeting effectiveness: The role of design characteristics. *J. Bus. Psychol.* **2009**, *24*, 65–76. [CrossRef]
47. Odermatt, I.; König, C.J.; Kleinmann, M. Meeting preparation and design characteristics. In *The Cambridge Handbook of Meeting Science*; Cambridge University Press: New York, NY, USA, 2015; pp. 49–68.
48. Cohen, M.A.; Rogelberg, S.G.; Allen, J.A.; Luong, A. Meeting design characteristics and attendee perceptions of staff/team meeting quality. *Group Dyn. Theory Res. Pract.* **2011**, *15*, 90–104. [CrossRef]
49. Elsayed-Elkhouly, S.M.; Lazarus, H.; Forsythe, V. Why is a third of your time wasted in meetings? *J. Manag. Dev.* **1997**, *16*, 672–676. [CrossRef]
50. Tobia, P.M.; Becker, M.C. Making the most of meeting time. *Train. Dev. J.* **1990**, *44*, 34–38.
51. Kerr, N.L.; MacCoun, R.J.; Kramer, G.P. Bias in judgment: Comparing individuals and groups. *Psychol. Rev.* **1996**, *103*, 687. [CrossRef]
52. Gladstein, D.L. Groups in context: A model of task group effectiveness. *Adm. Sci. Q.* **1984**, *29*, 499–517. [CrossRef]
53. Forsyth, D.R. *Group Dynamics*; Wadsworth/Cengage: Belmont, CA, USA, 2010.
54. Briggs, R.O.; de Vreede, G.J. Meetings of the Future: Enhancing Group Collaboration with Group Support Systems. *Creat. Innov. Manag.* **1997**, *6*, 106–116. [CrossRef]
55. Woolley, A.W.; Ishani Aggarwal, I.; Malone, T.W. Collective intelligence and group performance. *Curr. Dir. Psychol. Sci.* **2015**, *24*, 420–424. [CrossRef]
56. Malone, T.W.; Laubacher, R.; Dellarocas, C. The Collective Intelligence Genome. *MIT Sloan Manag. Rev.* **2010**, *51*, 21–31. [CrossRef]
57. Volkema, R.J.; Niederman, F. Organizational meetings: Formats and information requirements. *Small Group Res.* **1995**, *26*, 3–24. [CrossRef]
58. White Arkitekter, Ca 600 Employees. Available online: www.white.se (accessed on 30 August 2019).
59. Sweco Architects, Ca 600 Eumployees. Available online: www.sweco.se (accessed on 30 August 2021).
60. Schön, D.A. *The Reflective Practitioner: How Professionals Think in Action*; Basic Books Inc.: New York, NY, USA.
61. Lewin, K. Action Research and Minority Problems. *J. Soc. Issues* **1946**, *2*, 34–46. [CrossRef]
62. Dunbar, R.I. The social brain hypothesis. *Issues New Rev.* **1998**, *6*, 178–190. [CrossRef]
63. Finn, G. Vygotsky and the social dimension. In *Piaget, Vygotsky & Beyond: Central Issues in Developmental Psychology and Education*; Routledge: London, UK, 2003; pp. 101–107.
64. Mercer, N. The Social Brain, Language, and Goal Directed Collective Thinking: A Social Conception of Cognition and Its Implications for Understanding How We Think, Teach and Learn. *J. Educ. Psychol.* **2013**, *48*, 148–168. [CrossRef]
65. Isaacs, W.N. Taking flight: Dialogue, collective thinking, and organizational learning. *Organ. Dyn.* **2008**, *22*, 24–39. [CrossRef]
66. Engel, D.; Woolley, A.W.; Jing, L.X.; Chabris, C.F.; Malone, T.W. Reading the Mind in the Eyes or Reading between the Lines, Theory of Mind Predicts Collective Intelligence Equally Well Online and Face-To-Face. *PLoS ONE* **2014**, *9*, e115212. [CrossRef] [PubMed]
67. Kim, Y.J.; Engel, D.; Williams, A.; Woolley, A.I.; Chabris, C.; Takahashi, M.; Nemoto, K.; Kaiser, C.; Malone, T.W. Collective Intelligence in Computer-Mediated Collaboration Emerges in Different Contexts and Cultures. In Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems (CHI '15), ACM, Seoul, Korea, 18–23 April 2015; pp. 3769–3778.
68. Morewedge, C.K.; Kahneman, D. Associative processes in intuitive judgment. *Trends Cogn. Sci.* **2010**, *14*, 435–440. [CrossRef] [PubMed]
69. Grosse, E. A gestalt perspective on co-creation: Action research in architectural practice. In Proceedings of the Thirty-Fourth Annual Conference, Belfast, Northern Ireland, 3–5 September 2018.
70. Grosse, E.; Femenias, P. Action Research for sustainability: Co-creation overcoming fragmentation in multidisciplinary design teams. In *IOP Conference Series: Earth and Environmental Science*; IOP Publishing: Bristol, UK, 2020; Volume 588, p. 052060.
71. Coulture House. Available online: https://smartcitysweden.com/best-practice/394/sara-cultural-centre-one-of-the-worlds-tallest-timber-buildings/ (accessed on 10 February 2022).
72. GSS-Tools-Group Support Systems. Available online: https://www.mentimeter.com/ (accessed on 30 August 2021).